

REFERENCE COPY

DO NOT REMOVE  
FROM THIS ROOMFREE  
FULL-SCREEN  
DOSUTILITY

## Data Security: PC Labs Tests 13 Tape Backup Systems



- We Review the 6 Top-Selling Project Managers
- HomeBase and Desk Plus Challenge SideKick



# Pure power.

QIC-60 streaming tape backup is more than just fast and simple to operate. It's also the leader in powerful processing.

For example, our unique five-head tape deck offers immediate read-after-write verification. No rewinding necessary. And no re-recording of the entire backup after an error.

Another powerful advantage is automatic adjustment of the head mechanisms to seek the best track alignment every time a tape is inserted. Plus our exclusive power sensor is designed to alert and freeze the write head if PC power is reduced, which eliminates the chance of disk damage. We're so confident in the technical excellence of QIC-60 that we offer an aggressive one-year limited warranty on the entire line, compared to the 90-day warranty provided by other manufacturers.

Best of all are a pair of backup bonuses that turn QIC-60 into a sophisticated data management tool. When you select mirror-image restore, QIC-60 sees bad disk sectors and automatically reroutes data to safe locations for improved data reliability.



Tecmar offers AT owners a special enhancement with an internally-mounted QIC-60 tape drive that costs even less than external systems. And when you add our internal AT Hard Disk to the package, you have a fully upgraded system ready to use today.

Pure speed. Pure power. Pure innovation from Tecmar.

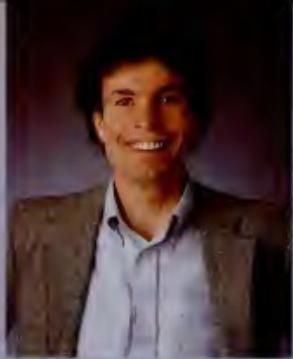
For a free demonstration of the new standard in tape backup, see your Tecmar dealer or call us at 216/349-1009 for the location of the dealer nearest you.

**Tecmar**  
THE POWER BEHIND THE PC

6225 Cochran Road Solon, Ohio 44139

CIRCLE 501 ON READER SERVICE CARD

# Let David Rose tell you about our powerful new ProKey 4.0.



David Rose, inventor of ProKey.

Spend 2 minutes learning how to add a powerhouse of function to your keyboard with a terrific new version of ProKey!

"Suddenly others have discovered what RoseSoft has known since we invented the ProKey concept. If your keyboard could work a whole lot harder, your life would be a whole lot easier.

The original idea behind ProKey was a program that would let you store strings of keystrokes you could recall at a touch. Now there's ProKey 4.0 and it's better than ever."

#### ProKey 4.0 keyword macros unsnarl PC use.

"If you're a serious PC user, you probably use a variety of software programs. Spreadsheet. Word processing. Database. Communications. Plus the special-function programs you use to run your business or department.

And all these programs have different complicated commands that are tedious to type and easily forgotten. How much easier life would be if all you needed to operate your program was a small vocabulary of sensible words.

Want to log onto Dow Jones with your communications package to check on how your IBM stock is doing? Just type the keyword you previously selected for this function, "IBM". Need to print a profit and loss statement? Typing "p&l" is all it takes.

Behind the scenes, ProKey 4.0 checks its memory for the string of commands required to carry out the task and executes them automatically. Forgotten what functions you have available? Just call up the built-in menu that describes them in plain English.

Need to add a function? Enter the commands. Enter a description. Store them both away without leaving the program you're working with.

Built-in editing, English language menus, multi-character macro names and the ability to instantly change sets of functions. These are just four of the exciting new features that make ProKey 4.0 the most powerful macro processor you can buy."

#### ProKey 4.0 lets you customize your keyboard.

"Only ProKey has the unique Layout program that lets you redesign your keyboard to correct design flaws the manufacturers built in. You can change the location of any key, create a DVORAK layout, or make a duplicate set of arrow keys away from the keypad."

#### ProKey Is the Industry Standard.

"ProKey has all the features you need to make your life a whole lot easier. And RoseSoft has three years experience supporting customers who use macros. Including over 80% of the Fortune 100.

Don't be misled by the recent claims of ProKey imitators; they're comparing themselves against old versions of ProKey.

The choice is simple. Do you want an unknown, untested product in its first generation, or ProKey 4.0's power and features? The difference in price will hardly pay for dinner. The difference in performance is like night and day."

ProKey 4.0 runs on IBM and other compatible MS-DOS computers, and works with 99% of the software they use. \$130 suggested retail price at software dealers everywhere. Or call RoseSoft. (206) 524-2350.



RoseSoft™

4710 University Way N.E.  
Seattle, WA 98105  
(206) 524-2350

CIRCLE 129 ON READER SERVICE CARD



# Discover what the editor



Discover the features, value, and performance that have been confirmed in rave reviews of our products. (Ask us for copies!) Recently, INFOWORLD awarded our PC20 the runner up prize for "1985's Best Hardware Value". It's the same value that has made Qubie' a trusted supplier to corporations like IBM, General Motors, and Exxon since 1982.

PC WORLD summarized our PC20 hard disk this way: "It's bargain-basement price, excellent documentation, drive replacement policy, and changeable interleave, may be the best deal going."

Value means low prices with no extra charges for freight, insurance, or COD's. It means products backed up by our 30-Day No Risk Guarantee (we even pay the return freight if you are not satisfied), and our 48 hour turnaround on warranty repairs.

Don't settle for the best price, buy the best value -- Qubie'.

## HARD DISK SUBSYSTEMS

**PC20 (Internal) \$599**

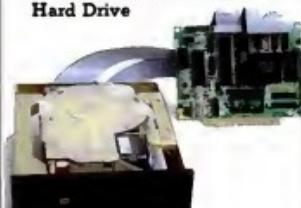
20 Megabyte Capacity • Boot From The Hard Disk - No Software Patches Or Drivers To Install • Runs All The Popular Software--DOS 2.0 Or Later • Low Power Consumption • 5 1/4" Controller Card • High Reliability And Durability -- Specialty Plated Drives • Faster Access Time Than XT - Changeable Interleave Value • Includes Cables, Our "Visual Shell" And **ZyINDEX** "Info Searcher" Software



**PC130W \$109**  
130 Watt Power Supply For The IBM PC

**PC20E (External) \$749**  
External Model Includes Case And Power Supply

**PC44 \$1288**  
Same As PC20 With BT44 Hard Drive

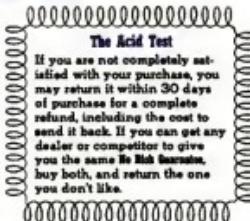


**THE STACK**  
**PC20D/T \$999**

Includes: PC20 Hard Disk System And BT/SP10 Spooling Tape Backup • Tape Plugs Into External Connector On Floppy Card • Image And File By File Backup And Restore • Tapes \$12.95 Each, Or 6 For \$59.95

**PC20D/TE (External) \$1149**

Includes Case With Fan And Power Supply



✓ And PC, PC World, PC Week & PC Products

# s of INFOWORLD did.



#### 300/1200 BAUD MODEMS

PC212A/1200 (Internal) \$179  
212A/1200E (External) \$199

Auto-Dial, Auto-Answer,  
Bell 103/212A Modems •  
Fully Hayes Compatible,  
Runs Crosstalk, Sidekick, Etc.  
• Internal Modem Includes  
External RS232-C Serial  
Port And PC-TALK III  
Software • External Has  
Eight Status Indicators Lamps  
And Front Snap Hatch For  
Quick Switch Access • Both  
Include Instruction Manual  
And Modular Phone Cord •  
Shielded Cable For External  
Modems \$19 (Specify Type)



#### AT ENHANCEMENT KIT

BT44 Hard Drive &  
AT4X4PIns (512K) \$1295

44 Megabyte Drive • Runs  
All The Popular AT Software  
• 28 msec. Access Time •  
Voice Coil Driven Heads  
with Closed Loop Servo  
Positioning • Full-Height  
Unit • No Extra Chips Needed

#### AT MULTIFUNCTION CARD

AT4X4PIns (128K) \$265  
AT4X4Plus (512K) \$295

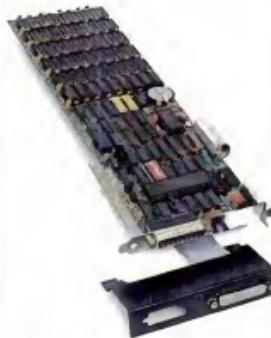
Memory Sockets For Adding  
Up To 4 Megabytes • 1  
Standard and 3 Optional  
Serial Communications Ports  
• Parallel Printer Port •  
Game Port Option



#### PC MULTIFUNCTION CARD

BT6PIns (64K) \$147.50  
BT6PIns (384K) \$197.50

Memory Sockets For Adding  
Up To 384K • Parallel Printer  
Port • Asynchronous Serial  
Communications Port •  
BTpak Software (Disk  
Emulation and Printer  
Spooling) • Battery •  
Powered Clock/Calendar •  
Optional Game Port •  
Includes Dual Mounting  
Bracket



#### RGB & MONOCHROME MONITORS with Tilt/Swivel Base

RGB Color HR31-200 \$399  
Color Adapter \$139  
RGB for EGA HR31-350 \$499  
Mono. Green HR39 \$139  
Mono. Amber HR134 \$149

RGB Color Monitors Feature  
.31mm Dot Pitch And Large  
14" Screen • HR31-200  
Compatible With IBM Color  
Graphics Adapter (640x200)  
• HR31-350 For IBM EGA  
(640x350) • Monochrome  
Monitors Have IBM Compat-  
ible (720x348)  
Resolution On 12" Dia-  
gonal Screen

For fastest delivery, send cashier's check,  
money order, or order by MasterCard/  
Visa. Personal checks allow 18 days to  
clear. Company purchase orders  
accepted, call for prior authorization.  
California residents add 6% sales tax.

Hours M-F 8 am - 5 pm PTZ  
Sat 8 am - 12 pm PTZ



London (01) 223-4569  
Paris (01) 321-5316  
Sydney (02) 579-3322  
Canada (403) 434-9444



Outside California  
**800-821-4479**  
Inside California  
**805-987-9741**

**QUBIE'**

Department P  
4809 Calle Alto  
Camarillo, California 93010

# GREAT SOFTWARE AT MODEST PRICES

Some samples from our library of over 400 disks:

<b>Desk Organizer</b>	A great pop-up helper phone dialer, note pad, calendar, and calculator—more than just a sidekick!
<input type="checkbox"/> #405 Deskmail	\$6
<b>Communicator</b>	With xmodem error detection
<input type="checkbox"/> #406 PC Talk	\$6
<input type="checkbox"/> #309 Modem	\$6
<b>Assembler</b> with tutorial Great way to learn assembly language!	
<input type="checkbox"/> #10 Crash, the Cheap ASSEMBLER	\$6
<b>Draw</b> on your computer screen.	
<input type="checkbox"/> #344, #345 PC Key Draw	\$12
<b>Spreadsheet</b> simpler than Lotus but effective.	
<input type="checkbox"/> #199 PC-Calc	\$6
<b>Powerful database management programs</b>	
<input type="checkbox"/> #5 PC-Fila— tried and true	\$6
<input type="checkbox"/> #267 #268 File Express—a new one	\$12
<b>BASIC tutorial</b> A nice way to learn BASIC with acute introduction	
<input type="checkbox"/> #105 PC Professor	\$6
<b>Word Processing</b>	
<input type="checkbox"/> #294 Edit	\$6
<input type="checkbox"/> #78 PC-Write	\$6
<b>Music to soothe the soul</b>	
<input type="checkbox"/> #279 Planman	\$6
<b>Disk cataloging program</b> Keep track of that growing pile of floppies.	
<input type="checkbox"/> #106 Diskcat	\$6
<b>Artificial intelligence languages</b>	
<input type="checkbox"/> #417 Prolog and Unforth	\$6
<input type="checkbox"/> #148 Xlisp—experimental version of LISP	\$6
<b>Games</b> Some of the most interesting games on, or off Earth	
<input type="checkbox"/> #293 Space Games	\$6
<input type="checkbox"/> #390 Flight and others	\$6
<input type="checkbox"/> #274 Best Games	\$6
<input type="checkbox"/> #354 PC Jr games	\$6
<b>Recovor lost files</b> A file-examine/repair utility, similar to Norton's utilities	
<input type="checkbox"/> #133 Ultra Utilities	\$6
<b>DOS Help</b> and explanations for the new user with descriptions of DOS. Just type "HELP!"	
<input type="checkbox"/> #254 PC DOS Help	\$6
<b>Housekeeping</b> Some of our favorite utilities	
<input type="checkbox"/> #273 Best Utilities	\$6
<b>Unprotected popular software</b> Allows backup or transfer of software to a hard disk.	
<input type="checkbox"/> #184 #376	\$12
<b>General Ledger program</b> with accounts receivable package	
<input type="checkbox"/> #331 PC-General Ledger	\$6
<b>Typing tutor</b> to train those digits to dance	
<input type="checkbox"/> #120 Touch Type	\$6
<b>Something for programmers:</b>	
<input type="checkbox"/> Collection of C-language disks (6 disks)	\$36
<input type="checkbox"/> Collection of Turbo Pascal disks (6 disks)	\$36
<b>Something for Lotus lovers:</b>	
<input type="checkbox"/> Collection of Lotus 1-2-3 worksheets and macros (6 disks)	\$36

**The PC-SIG Library** For more software than you thought possible try the directory Search electronically for topics of interest.

<input type="checkbox"/> PC-SIG directory on disk (3 disk set)	\$18
350-page paperback directory	\$8.95

**Membership** For a directory, newsletters, and more try our membership.

PC-SIG Membership \$15

Most programs have documentation on disk and request a donation from satisfied users. Please add \$4 postage and handling—California residents add state sales tax.

Total \$\_\_\_\_\_ by  Check  Visa  MC

Card No \_\_\_\_\_

Exp date \_\_\_\_\_ Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**PC-SIG** 1030 East Duane Ave., Suite J

Sunnyvale, CA 94086

(408) 730-9291

To order call: **800-245-6717**

In CA **800-222-2996**



## PUBLISHER

William Lotze

## EDITOR

Bill Machrone

## EXECUTIVE EDITORS

Barry Owerk, Paul Sommers

## SPECIAL PROJECTS EDITOR

John Dickenson

## SENIOR EDITOR

Bill Howard

## TECHNICAL EDITOR

Craig L. Stark

## ASSISTANT MANAGING EDITORS

Laura Simone, Guy Venable

## MANAGER, COPY EDIT

Linda H. Johnson

## ASSOCIATE EDITORS

John Bernick, Jennifer de Jong, Lisa Kleinman, Barbara Krasoff, Stephen Stalling

## SENIOR COPY EDITOR

Jane Lewis

## PRODUCT TESTING EDITOR

Michael O'Conne

## PRODUCTION EDITOR

Paul B. Ross

## ASSISTANT EDITORS

George Gaskins, Virginia Dusick, Virginia Dukak,

## COORDINATING EDITOR

Cherry Goldberg, Jane Minter,

## EDITORIAL ASSISTANTS

David Osgood, Ann Ovowale

## BUSINESS MANAGER

Greg Postnick

## PROOFREADERS

David Baker, Christina Dyer, Christopher Johnston,

## TECHNICIAN

Christina Okap, Paul Staford, Al Wenzel

## RECEPTIONIST

Michael Cohn, M. Stephene Ricks

## CONTRIBUTING EDITORS

Charles Rodriguez

## DESIGN DIRECTOR

Frank J. Deffler, Jr., Glenn Hart, Steve Holster,

## ART DIRECTORS

James Langford, Stephen Maries, Peter Norton, Charles Petrick,

## ARTISTS

Maria Porter, Wm. L. Rosch, Craig Stinson, Jared Taylor,

## LAYOUT ARTISTS

Robin Webber

## PUBLIC RELATIONS MANAGER

Jesusa Kenney

## PUBLIC RELATIONS ASSISTANT

Kimberly Humphries

## SINGLE COPY SALES DIRECTOR

Bob Wetherald

## ASSISTANT CIRCULATION MANAGER

Mike Krueger

## CIRCULATION COORDINATOR

Robert Smidt

## SENIOR AD PRODUCTION MANAGER

Susan DePerno

## AD PRODUCTION ASSISTANT

Patricia White

## SENIOR EDIT PRODUCTION COORDINATOR

Christine Wiles

## EDIT PRODUCTION COORDINATOR

Rosemary Taylor

## EDITORIAL DIRECTOR

Randi C. Fox

## ADVERTISING OFFICE

Ziff-Davis Publishing Company, One Park Avenue,

New York, NY 10016, (212) 563-5100

## COMPUTER PUBLICATIONS DIVISION

## PRESIDENT

Kenneth H. Koppel

## VICE PRESIDENT, PRODUCTION

Benard Davis

## VICE PRESIDENT, CREATIVE SERVICES

Heribert Stern

## VICE PRESIDENT, CIRCULATION

Alicia Marie Evans

## VICE PRESIDENT, MARKETING SERVICES

James Ranaley

## VICE PRESIDENT, FINANCIAL SERVICES

Ann Pollak Adelman

## MARKETING MANAGER

Hugh Tarter

## BUSINESS MANAGER

Barbara Rosenberg

## EDITORIAL DIRECTOR

Gary C. Gauson

Eileen F. Rueter

## ZIFF-DAVIS PUBLISHING

**President** Richard P. Fries **Senior Vice Presidents** Philip Sire, Kenneth H. Koppel **Vice Presidents** Rory Paris, William Phillips, J. Malcolm Morris **Treasurer** Selwyn Taubman **Secretary** Dennis Abrams

PC: The Independent Guide to Personal Computers ISBN 0-934529-00-8 is published bi-monthly except in July and August for \$44.95 for one year (12 issues). \$4.45 for each issue. \$11.00 for each annual subscription. PC Communications Corp., a subsidiary of Ziff-Davis Publishing Co., One Park Ave., New York, NY 10016. Several two-page programs \$10.00 each. All editorial material is copyrighted © 1986 by Ziff-Davis Publishing Co. All rights reserved. The information contained in this periodical is based on facts known at the time of publication. It is the opinion of the publisher that the information is reliable. The publisher does not warrant the accuracy of any statement made in this publication. The publisher reserves the right to accept or reject any subscription. No part of this publication may be reproduced in whole or in part without written permission of the publisher. Requests for permission should be directed to Area Publications, Ziff-Davis Publishing Company, One Park Ave., New York, NY 10016. Editorial correspondence may be addressed to Mktg/Mkt (212) 563-5100. PC Interactive Reader Service (212) 563-5100.



# In the business software jungle...



## there can only be one leader.

Quietly adhering to our belief that Running Is Believing,<sup>™</sup> Macola, Inc. has become the leader in Financial Software. From single to multi-user environments—all things considered—power, ease-of-use, cost and support—you can't buy better software. That's what leading is all about.

### It really is a software jungle out there.

Software packages hit the marketplace daily. From companies with track records shorter than a safari. Miracle promises. Miracle prices. You'll quickly discover why you got the software at a miracle price when you call the company you bought it from and try to work out your problems with an answering machine.

What we suggest is a good guide with experience in the business software jungle.

The guide you'll get if you have to call Macola—on our toll-free 800 lines—is an experienced computer programmer ready to handle your specific questions.

### Software with a past. Solid, reputable.

You can get state-of-the-art business software for micro-computers—backed with the finest credentials—from Macola, Inc. We've been leading the way for over a decade. Well guide you past the pitfalls; help you make the right choice.

We've converted the packages of the leading independent developer of mini-computer software. Those packages are the *de facto* standard for minis. By retaining all the power and sophistication of the mini-software and by adding the features demanded by the more than 15,000 accounting, manufacturing and distribution businesses using our software, Macola has developed the *de facto* standard for micros. And we're still pushing.

### Business software for all environments

Macola Financial Software—Accounts Receivable (A/R), General Ledger (G/L), Accounts Payable (A/P), Payroll (PR), Purchase Order (P/O), Inventory Management

(I/M), Assets & Depreciation (A/D), Customer Order Processing (COP), Bill of Material Processor (BOMP), and Report Writer (R/W) is written for single, multi-user and LAN environments. Recognized by Big Eight accounting firms like Price Waterhouse, our packages can go on-line individually or as an integrated system and can be used by companies with one micro to those with thirty or more. In fact, using IBM PCs and Macola Financial Software, many LAN products currently available are more powerful—and much less expensive—than most mini-computers being sold today.



### Software with a future. Sleek, fast, powerful.

Today's micro hardware can be pushed to the mini-limits. But only powerful micro-

software can generate that push. Macola Financial Software is compiled and runs under R/M COBOL Release 2.0



which has improved speed.

But for our End Users, VARs and

System Integrators who all wanted much faster processing speed, we have also converted our packages to Micro Focus Level II COBOL. With Micro Focus and your IBM PC (or PC compatible) you can drive our business packages up to 400% faster! That means fewer processing problems and greater productivity for the End User.

The good guide always does what's necessary for the survival of his clients.

### Dealers, VARs, System Integrators ...

Macola Financial Software will become an integral part of your computer package. Its modularity, ease of use, power and support services can help you place of lot of systems. Contact us about the many benefits of our Authorized Reseller Program. Here are our toll-free numbers...

1-800-468-0834 (Cont. U.S.A.)

1-800-468-0833 (Ohio only)

1-614-382-5991

Telex 5106002104 MACOLAUSA

**MACOLA**

FINANCIAL SOFTWARE  
181 South Main St., P.O. Box 485  
Marion, Ohio 43302

CIRCLE 263 ON READER SERVICE CARD  
Macola, R/M COBOL, Micro Focus Level II COBOL, IBM PC, COMPAQ, AT&T, Leading Edge, and Televideo are registered trademarks.



## COVER STORY

### Tape Backup: Measuring Speed and Cost per Megabyte

**Bill Machrone**/As PC users install ever larger hard disks, the potential for incapacitating DLD (data loss depression)



keeps growing. But there is help: tape backup prevention. In this cover story evaluation of 13 standalone tape backup units, PC Magazine Labs gets down and dirty, testing them for the criteria that count most: speed, cost per backed-up megabyte of data, and the quality of software that makes them work ..... 106



## Tape Backup: Technologies In Competition

**Craig L. Stark**/All tape backup systems are not created equally. A look at the merits and liabilities of the three 1/4-inch standards competing for your attention in the tape backup marketplace ..... 140

## FEATURES

### SOFTWARE

**The Organizing Principle**  
*Richard Aarons*/There are two kinds of people: those who like schedules and organization and those who don't. Many of the first type have taken to desktop utilities—cheap, handy memory-resident programs that help them stay on track. Two new ones, *HomeBase* and *PolyWindows DeskPlus*, sport spiffy enough features to outclass their first-generation competitor *SideKick* ..... 149

### Project Management

**Software: The Top Sellers**  
*Alfred Poor and Bruce Brown*/How well do specialized project-planning programs work on PCs? A revealing inspection of six best-sellers from among these often misunderstood packages ..... 155

### Harnessing the Laser Printer

**Glenn Hart**/You no longer have to sacrifice your favorite word processor to link up to an otherwise slick and appealing laser printer. New laser printer utilities forge compatibilities where there were none before ..... 205

## COMMUNICATIONS

**RCA Enters the E-Mail Fray**  
*Barbara Krasnow*/Has one of our all-time favorite products, that good friend to business, MCI Mail, finally met its match? RCA would like to think so now that the giant communications company has introduced RCA Mail for PCs ..... 171

## FINANCE

### Live Market Quotes on Your PC

**Michael Gianturco**/The commodity most valuable to a stock or option trader is up-to-the-minute information. How soon is soon enough? Two radio-modem and software packages, Lotus Information Network's *Signal* and Telemet America's *Radio Exchange*, use FM radio broadcasts to bring instantaneous live market quotes to everyman's PC screen ..... 181

## THE PRICE

### WATERHOUSE REPORT

**An All-Inclusive Accounting Library**  
*Mike Falkner, Pat Fitzhenry, and G. William Dauphinais*/The *Business Library* is a comprehensive collection of accounting software modules for a power accounting environment ..... 187





Page 106

## COLUMNS/DEPARTMENTS

**LETTERS TO  
PC MAGAZINE** ..... 13

**PC ADVISOR**  
*Gus Venditto/Hardware and software advice* ..... 23

**PC NEWS** ..... 33

### FROM THE EDITOR'S SCREEN

#### Unbridled Optimism

*Bill Machrone/Slump? What slump? Fact is, the PC industry has entered an exciting period of innovation* ..... 59

### THE NORTON CHRONICLES

**An Imperfect B&W Monitor**  
*Peter Norton/A look at Roland's MB-142 black-and-white monitor* ..... 69

### PC PERSPECTIVES

**Unbundling Software Support**  
*Jim Seymour/The problems (and some solutions) of after-sale software support* ..... 87

### COMPUTERS IN SOCIETY

**Technology with a Small "t"**  
*Stan Augarten/The subtle manifestations of technology* ..... 99

### PROGRAMMING/UTILITIES

**Fix Up Commands with DOS-EDIT**  
*Charles Petzold/DOS-EDIT lets you edit DOS commands full screen* ..... 217

### SPREADSHEET CLINIC

**Jared Taylor/Hints and macros: entering dates and writing fine print** ..... 243

### POWER USER

*Craig L. Stark/Tips on Turbo Pascal* ..... 249

### USER-TO-USER

*Paul Somerson/Hints on global file cleaning* ..... 257

### PC TUTOR

*Charles Petzold/Memory-resident programs* ..... 263

### REVIEWS IN BRIEF

*David Obregon/An affordable upgrade for the PC Keyboard, a cursor-control device, and an on-line encyclopedia* ..... 266

### THE SHORT REPORT

*Phil Wiswell/Add-on shortcuts for I-2-3* ..... 268

### NEW ON THE MARKET

*David Obregon/What's new in mass storage, video display, and computerized credit checks* ..... 269

### PC MART

..... 274

### PC BLUEBOOK

..... 277

### READER SERVICE

**CARD** ..... 289

### PRODUCT INDEX

..... 297

### BOOK REVIEW

*The C Around Us*  
*Charles Petzold/Reviews of two book on C* ..... 301

### INDEX TO

**ADVERTISERS** ..... 303

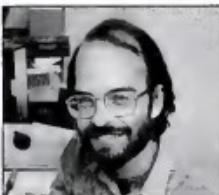
### COMING UP

..... 304

### Cover Photograph:

Roberto Brosan

# WHAT'S INSIDE



When *PC Magazine* first decided to tackle tape backup, we had great expectations. Products from Alloy, Cipher, Genoa, Hewlett-Packard, Interface, Lintec, Maynard, Micro Design, Sigma Design, System, and Tecmar sat ready and waiting to be tested in PC Magazine Labs. We hoped our findings would reveal lightning-fast speed, painless operation—in short, that these products would offer a simple means of copying the contents of a hard disk that would forever end the drudgery of this housekeeping chore.

Unfortunately, that wasn't what happened at all. We had barely uncrated and plugged in the units when the trouble began. The first several units out of the box simply did not work. As Bill Machrone recounts in his introduction, "We had to invest several man-days before we could determine that it was them, not us." To find out how the Labs finally got them up and running and how it evaluated their performance, turn to the lead article, "Tape Backup: Measuring Speed and Cost per Megabyte" on page 106.

Crazy as it sounds, nearly all the products tested are incompatible with one another. They use different media, different formats, and different file-handling techniques. Which approach is best? Each manufacturer, of course, believes its approach is best. Technical editor Craig L. Stark sorts out their claims in "Tape Backup: Technologies in Competition," page 140.

Meanwhile, as we slugged it out with the backup units, Alfred Poor and his partner Bruce Brown, of Soft Industries Inc., were managing *PC Magazine* projects in their Southington, Connecticut, offices. This in itself was not so unusual, but these projects had nothing to do with day-to-day business. They were hypothetical scenarios created by Poor and Brown to evaluate project management software. The duo put six of the top-selling project managers through a real-life business task and summed up the performance and features of each. For results, turn to page 155.

And there's more. Dick Aarons looks at *HomeBase* and *PolyWindows DeskPlus*, two desktop utilities that challenge SideKick (see "The Organizing Principle," on page 149). Speaking of utilities, don't overlook Charles Petzold's memory-resident DOS-EDIT utility in the Programming/Utilities column (page 217). One frustrating thing about DOS is that it recognizes just one line. Petzold's program frees up the cursor so that it's not trapped on one line at a time. This means that you can modify and reexecute old commands quickly and painlessly. Petzold's program, like Petzold himself (pictured above), is a real DOS tamer. ■

**FEW  
MORTALS  
HAVE SEEN  
QUALITY  
SUCH AS THIS...**

**EVEN FEWER  
COULD  
AFFORD IT...**

**UNTIL NOW  
THE  
PHOENIX  
WAS  
ONLY A  
MYTH.**

CONTACT YOUR LOCAL  
DEALER, OR CALL...

**1-800  
362-  
4449**

THE HARD DISK  
DRIVE MARKET  
WILL NEVER BE  
THE SAME AGAIN



501 West Algonquin Road  
Arlington Heights, Illinois 60005

THE  
**PYRAMID**  
SUBSYSTEM



From  
**\$2395<sup>00</sup>**

**COMPLETE**

From 10 to 140 MB  
**HARD DISK SUBSYSTEM**  
with integral  
45 to 60 MB  
streaming  
**TAPE BACK-UP**

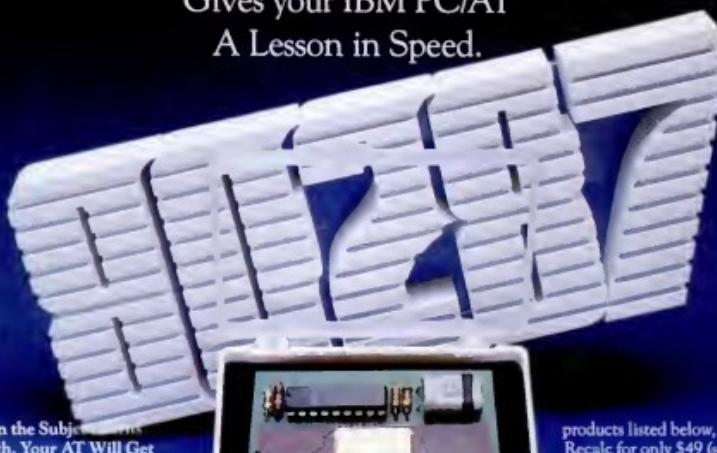


**APPEARING  
ONCE  
EVERY  
500  
YEARS...**



# HAUPPAUGE

Our 287 FAST/5  
Gives your IBM PC/AT  
A Lesson in Speed.



Now, When the Subject Comes to Fast Math, Your AT Will Get an A+.

Right now, the 80287 math Co-processor in your PC/AT runs at 4MHz. Which means there's room for improvement. That's why Hauppauge has developed the

unique 287 FAST/5—a module that gives your AT an unmatched 5MHz capability. Speeding up your math computations by 25%. Now that's an A+ performance! To insure easy installation, we've created a carrier mount for our 287 FAST/5. Just plug the module into your PC/AT's 80287 Numeric Coprocessor socket. No expansion slot required.

products listed below, you can get Recalc for only \$49 (suggested retail price is \$95).

**87 CHIP .....** \$129  
Our 80287 Math Coprocessor for the IBM PC, PC/XT and PC compatibles.  
**87-2 CHIP .....** \$229  
8 MHz Math Coprocessor for

Compaq Desk-Pro and Olivetti PCs.

**287 CHIP .....** \$249  
80287 Math Coprocessor chip that runs at 4MHz in the IBM PC/AT.  
**287 FAST/5 .....** \$249  
Our 80287 Math Coprocessor enhancement module that boosts speed in the IBM PC/AT to 5MHz.

## 1-2-3 GETS A LESSON IN SPEED, TOO!

### Introducing Hauppauge's New Lotus Support

In addition to our 287 FAST/5, Hauppauge has recently developed a Lotus 1-2-3 support package that can accelerate your calculations up to 30 times. The package? Our 8087 coprocessor chip and Recalc™ software. Recalc links your Lotus 1-2-3 program to the fast math capability of our 8087 chip. By sending numeric operations to the 8087, computation time can be reduced from 60 seconds to as little as 2 seconds. And the more complex the calculation, the more time you save!

### Affordability

We've raised the speed limit for Lotus 1-2-3 and lowered the cost of Recalc software. When you buy any of the Hauppauge

### Now Available! The 287 FAST/8 .....

\$379  
In addition to our 1-2-3 support, we're introducing our new 287 FAST/8—a module that gives your IBM PC/AT an unprecedented 8 MHz capability. Doubling the speed of your math calculations! (module pictured above)

Hauppauge's 287 FAST/5 and Lotus support package are teaching the IBM PC, PC/XT and PC/AT a thing or two about fast math. Learn more by calling us today—or contact your local computer dealer.

### Hauppauge Computer Works

358 Veterans Memorial Highway, Suite MSI  
Commack, New York USA 11725 (516) 360-3827  
Available from your local computer dealer

# INSTANT GRATIFICATION

*Pop-Up 8 Powerful Tools, Including A Word Processor, Any DOS Command—Even Your Favorite Application—at The Touch Of A Key*

## A. SATISFIED CUSTOMERS ARE THE BEST FORM OF ADVERTISING—LISTEN TO WHAT POP-UP® DESKSET® USERS SAY:

*New York Times*, Erik Sandberg-Diment—When it comes to overall ease of use and efficiency, Pop-Up DeskSet is probably the winner.

*Computer Buyers Guide & Handbook*, Paul Rothweiler—DeskSet Plus rates and gets from CBG & H the highest of marks.

*InfoWorld*—DeskSet has taken the Sidekick idea a step further.

*Byte*, Mark Welch—I found DeskSet's Pop-Up Calculator to be the best for office work.

*PC World*, Danny Goodman—Financial Calculator is the height of functionality. Perhaps the best feature of Pop-Up DeskSet Plus is the Clipboard when used in tandem with a recent addition called Pop-Up Anything.

*Business Software—Pop-Up* PopDOS is an almost necessary addition to the operating system.

*Computer Retailers' Guide*, Mick Taylor—The DeskSet is a very powerful set of tools that is both flexible and easy to use.

*Online Today*, Ernest Mau—Pop-Ups add flair to operations and enhance computer utility.

*Cummins Engine Co.*, Ivan Myers—Much better than the competition (know anyone who wants to buy a "Sidekick"? \$25).

*J.P. Edmunds*—It is so good, your computer is not complete without it.

*Hewlett-Packard*, Samson Espartero—Very impressed with automatic/timed program execution.

*Atlantic Richfield Co.*, Craig Parker—for the first time I can use my printer options!

*On the Wing*, William Gross—Outstanding!

*State Law Library*, Austin, Texas, Jim Hamblen—I find PopDOS very helpful in arranging documents on my data disk when using WordStar.

*Planning Research Corp.*, William Hand—It is a big help in keeping me on schedule.

*iRT Corporation*, Jack Wilson—Very

useful and easy to learn and use.

## C. POP-UP DESKSET IS THE RIGHT CHOICE—AT THE RIGHT PRICE

Pop-Up DeskSet gives you Pop-Up Word with Scheduler and cut-and-paste, Alarm Clock, Calendar, Standard and Financial Calculator, Phone Dialer, Pop-UPS Utilities and Pop-Up Anything—enables you to run a second application anytime. All non-copy protected, and all for \$69.95\*. (Sidekick is \$89.95 for less.)

**Step up to Pop-Up DeskSet and save 50% Turn in your Sidekick and we'll send you Pop-Up DeskSet for \$35—that's ½ off.**

**Pop-Up DeskSet in more than one computer and save 50%**

Popular Programs, Inc. offers a multiple computer licensing plan that gives you ½ off on up to 10 additional copies of Pop-Up DeskSet. Your company needs more than 10? Call 206 822-7065 for further information.

**Why you'll want to spend \$60 more if you have a Hayes-Compatible Modem** Pop-Up DeskSet Plus has something no other desktop package has: Pop-Up TeleComm, a high-speed telecommunications program. And like all the Pop-Ups, TeleComm is available instantly—at the touch of a key: \$129.95\*

## B. COMPARE POP-UP DESKSET WITH WHAT THE COMPETITION OFFERS—NO OTHER DESKTOP PACKAGE EVEN COMES CLOSE!

	Pop-Up DeskSet	Sidekick™	Spotlight™
Automatic word wrap	YES	No	No
Word processor files unlimited in size	YES	No	No
Search and replace	YES	Yes	No
Clipboard (copy, move, delete)	YES	Yes	No
Keystrokes required to pass 20 lines of numbers into spreadsheet	6	52	Can't
Adjustable margins	YES	Yes	No
Schedule message size	UNLIMITED	Sechar	35char
Alerts you to appointments	YES	No	Yes
Graphical calendar (month view)	YES	No	No
Start programs at specific time (unattended operation)	YES	No	No
Display time constantly	YES	No	No
Date stamp documents	YES	No	No
Calculator has on-screen and printable tape	YES	No	No
Does financial calculations (interest, annuities, etc.)	YES	No	No
Statistical analysis mode (standard deviation, etc.)	YES	No	No
Allow user access to any DOS command	YES	No	No
Allow user to run any program while within another	YES	No	No
Set up printer while in an application	YES	No	No
Use printer as electronic typewriter	YES	No	No
Auto dial phone numbers	YES	Yes	No
Tools entirely RAM-resident	YES	No	No
Load only what you want/expand as needed	YES	No	No

*P.C. Tech Journal*, Ted Forgeron—SideKick has been banished from my hard disk to a dark corner of my Flip-n-File.

*Robert Newman*—Excellent—meets my needs better than Sidekick.

*David Gleason*—It's great for dBase development to be able to print, rename, view files without exiting.

*Professional Business Equipment, Inc.*—Works very well on a multiuser environment. Customers have been very impressed. We expect to sell them with many of our systems.

## TELECOMMUNICATIONS

	Pop-Up TeleComm	Sidekick™	Spotlight™	Cost Sav. %*	Total Cost Sav. %*
Available any time (at a keystroke)	YES	No	No	No	No
Read text directly from service provider	YES	No	No	No	No
Send and receive fax and binary files	YES	No	Yes	Yes	Yes
Hayes modem baud rates supported	500-1200	None	500-1200	500-1200	500-1200
Direct connect baud rates supported	2400	None	2400	2400	2400
Specifically supports PABX and long distance services	YES	No	No	No	No
Automatically logs into service	VT-52/VT-100 terminal emulation	YES	Yes	Yes	Yes

Use our toll-free number to order direct:

**1-800-44-POP-UP**

(1-800-447-6787)

Available through 500 DEALERS coast-to-coast and through major distributors



**POPULAR  
PROGRAMS, INC.**

Formerly Bellsoft, Inc.

135 Lake Street, Suite 180, Kirkland, WA 98033

(206) 822-7065 • Telex 741-5772 MCI

Telescommunications requires a PC, XT, XT or 386/486 PC

Pop-Up® Pop-Ups are trademarks of Popular Programs, Inc.

Sidekick is a trademark of Borland International.

Microsoft is a registered trademark of Microsoft Corporation.

Crash Talk XVI is a registered trademark of Macmillan Inc.

Spotlight is a trademark of Lotus Development Corporation.

**\$10 FOR FULL FEATURED 90-DAY EVALUATION**

\*Prices quoted are for U.S. only.

**CIRCLE 103 ON READER SERVICE CARD**

Maxell Corp. of America, 60 Oxford Drive, Moonachie, NJ 07074



**maxell®**  
FLOPPY DISKS  
THE GOLD STANDARD

CIRCLE 229 ON READER SERVICE CARD

# LETTERS TO PC MAGAZINE

## TWO VIEWS OF APARTHEID

I enjoyed Stan Augarten's excellent column devoted to computers and apartheid (*Computers in Society, PC Magazine*, Volume 4 Number 25). It's about time we faced up to the role that business and technology often play in support of inhumane or totalitarian systems. I was, however, a little disappointed by his failure to mention that Apple Computer has stopped all shipments of its products to South Africa as a whole—not just to the security agencies or government. Perhaps if more U.S. companies were willing to take such a firm stand, we really could help bring about a peaceful change to that tortured land.

Douglas Peterson  
Chicago, Illinois

Are you changing your magazine into yet another social commentary book, or what? I do not subscribe to *PC Magazine* in search of yet another source of puerile homiletics such as the Augarten thing on apartheid. We have a God's plenty and to spare of vehicles open to such savants: Every newsstand groans under the weight of their sermons. Couldn't *PC Magazine* leave the sociology to them? You took up good editorial space with that stuff.

George Dark  
Elk Grove Village, Illinois

## DATABASE REFLECTIONS

I have used some of the software reviewed in the cover stories in *PC Magazine*, Volume 4 Number 21. The article "Cost-Effective Database Management" prompted me to take a second look at my copy of *PC File III*. I found it was just what I needed for simple applications, so I used it immediately.

The *Dac-Easy* accounting program was

favorably reviewed in "Taking Your Budget into Account" and was listed as the Editor's Choice, but I'd like to alert everyone to the shortcomings of this software.

The documentation for the program is good but time-consuming. It took about 16 hours to convert our set of books over to this system. After setting up the necessary files, a quick CHKDSK revealed to my horror that *Dac-Easy* had set up, all told, 1.5 megabytes of totally empty files onto my 10-megabyte hard disk, taking one-half of my usable space. I will fully use that extra space only when I fill all of these files to capacity.

I'm sure hard disk users at a larger business would flinch the way I did at the idea of wasting space on-disk for anticipated



needs. *Dac-Easy* does allow you to alter the file size at any time, but the process is quite time-consuming.

Another constrictive is that each account number is determined by a single entry in the general ledger interface and can be posted only to those particular accounts from the subsidiary module—not from the general ledger.

The individual modules in this program don't allow tailoring of any of the invoice formats, purchase orders, and so forth.

Bob Cooperrider  
Sheridan, Oregon

A spokesman from *DAC Software* told us that users have to define the file size in the setup procedure, so if it set aside 1.5 megabytes in file space, then that's what you told it to do. The reason *Dac-Easy* lets you update your general ledger only from a subledger is to avoid creating an imbalance. However, you always have the option of not creating any subledgers in a file. You're right about not being able to tailor the *Dac-Easy* forms, but *DAC* says that it's working on incorporating that and many other valuable user suggestions into its future releases.—Ed.

## QUADLINK ADVICE

In *PC Advisor (PC Magazine*, Volume 4 Number 22, page 38), Gus Venditto recommended Quadram's Quadlink emulation board to a reader. I'd like to add to what Venditto wrote. The Quadlink will run Apple II-family software even if it's copy protected. Quadram does hold back one bit of information, which I learned the hard way after a phone call to Quadram.

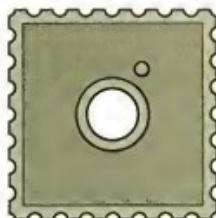
The board recognizes only one game port: its own. If you have any other game port operational, the board will not function.

Quadram doesn't furnish Integer BASIC. This may or may not be a problem for users. Other than these problems, the board does everything Quadram claims it does.

D.I. Saffrin  
Vernon Hills, Illinois

## SOULS OF THE NEW MACHINES

I always enjoyed Stephen Manes's wit and insight. However, while I'm sure that most of his audience read his review of *Midas Valley* (*Computers in Society*, Volume 4 Number 24) with a growing conviction



# Ven-Tel's Half Card™ modem is in all the best computers. Here's why...

Ven-Tel gives you lots of reasons to buy our Half Card™ modem for your IBM PC or compatible. The Half Card™ is a complete system that lets you communicate with other PCs, mainframes, and databases effortlessly. It includes Crosstalk-XVI® software. It's reliable. It's got all of the features you want. And it's a good value.

#### Do You Own One of These Computers?

Chances are you do. And if you're thinking of buying a modem, consider the Half Card™. Because of its small size, the Half Card™ fits in more computers, including all of the models we've listed here. The Half Card™ is small, so it fits in short slots or long. That means you can save your long slots for other expansion uses.

#### Effortless Communication

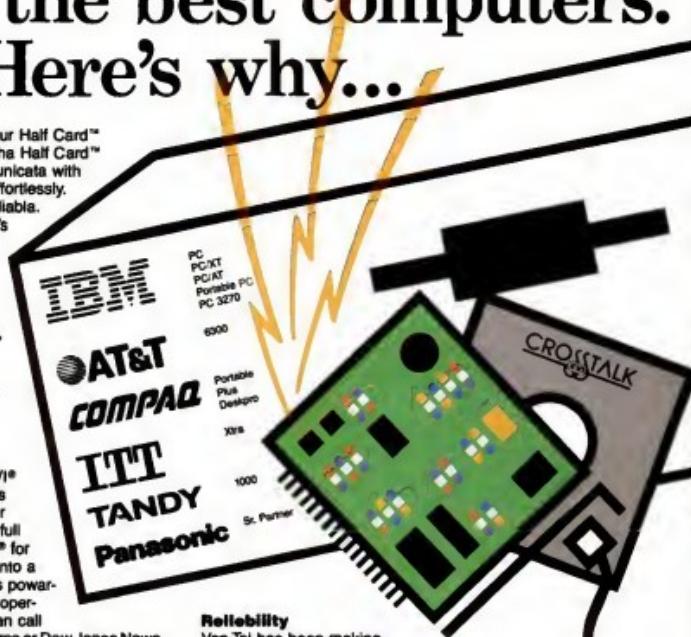
Each Half Card™ comes with Crosstalk-XVI® communications software, by Microstuf. It's the easiest to use, whether you're a beginner or an old hand, and the most powerful. A full on-line help menu makes using Crosstalk® for the first time a snap. You can turn your PC into a terminal on a mainframe computer with its powerful terminal emulation feature. It will even operate your PC when you're not there. You can call into an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, all at the touch of a button. The Half Card™ connects your computer to the world. Effortlessly.

#### More Modem for Your Money

When you buy the Half Card™, you don't need anything else. The Half Card™ is a complete communications package that includes a full-featured modem and the best known software on the market. Complete easy-to-understand instructions with full technical support on installation and use. And a very competitive price. The Half Card™ with Crosstalk-XVI® software, retails for only \$549.

#### Features

- 1200/2400 baud auto-dial, auto-answer.
- Uses the industry standard "AT" command set.
- Runs with virtually all communications software, including Smartcom II and PC Talk III and integrated packages such as Symphony and Framework.
- Includes Crosstalk-XVI® software.
- On-board speaker and extra phone jack for easy switching from voice to data mode.
- Selective tone or pulse dialing; full or half duplex.
- Automatic answer on any ring.
- True ring or busy signal detection.



#### Reliability

Ven-Tel has been making modems for 10 years. Our experience shows, Ven-Tel's Half Card™ only has about 70 parts, compared to almost 300 on other modems. We reduced the parts by building the first LSI modem chip using advanced switched capacitor technology. What that means to you is greater reliability and lower power consumption, so you can load up your PC with expansion boards and not worry about heat or power problems. And we back the Half Card™ with a full two-year warranty on parts and labor.

#### You Can Buy the Half Card™ Anywhere

You can get the Half Card™ at ComputerLand, Businessland, the Gannett Group, Entré Computer Centers, Macy's Computer Stores and other fine dealers nationwide. Also from Ven-Tel: the 1200 Plus™, an external modem and the PC Modem 1200™, an IBM internal with V.22 International capability.



#### Effortless Communication

**Ven-Tel Inc.**

2342 Walsh Avenue  
Santa Clara, CA 95051  
(408) 727-5721

## ■ LETTERS TO PC MAGAZINE

that Hollywood had indeed gone "Silicon Valley" until they reached the end of the article, the more astute fans of Manes's column must have come to the same conclusion that I did: that Manes's own prose is itself the work of a program even more sophisticated—DOS 2.0 or later—than the one he describes as punching out scripts and graphics for a TV movie. Casual readers probably overlooked the subtle twists and turns that marked the piece as a true mating of machine intellect and suitable application.

Think of the irony: A computer program that pretends to reveal an electronic conspiracy in Hollywood! This would make a great script in itself. To those of us who appreciate great hacking, this is the ultimate irony in artificial intelligence.

Then again, there is a rumor going around that there is a carefully crafted gem of a program that's generating fantastically clever letters to *PC Magazine*. The whole thing is chip-boggling.

Robert West  
Stone Mountain, Georgia

### MADE IN THE USA

In the caption accompanying the AT&T PC 6300 photo ("AT&T PC 6300," *PC Magazine*, Volume 4 Number 23), reference is made to the tilt-and-swivel mechanism that "shows the European concern for ergonomics."

Actually, the mechanism was devised in the United States. Also, both the keyboard and monitor housing for the AT&T PC 6300 were designed for AT&T by Henry Dreyfuss Associates and are manufactured by Olivetti for proprietary use on the 6300.

D.M. Genaro  
New York, New York

### ELECTRONIC PUBLISHING PERSPECTIVES

After reading Ron Jeffries's interview with Gary Kildall about electronic publishing (Quantum Leap, *PC Magazine*, Volume 4 Number 23), I worry about Mr. Kildall's assertion that "someone is going to say, 'Hey—we can save \$99 in manufacturing costs by using an optical disk!'"

Though I have great admiration for Mr. Kildall's contributions to the microcomputer revolution, the history of consumer

communications suggests that there are two other important factors in the equation. First, the material made available to the consumer in the new medium (CD ROM as opposed to paper book) must be either significantly cheaper or of better quality than that of the old medium. Second, the cost of acquiring the means to use the new medium must be either trivial or nonexistent.

We have done considerable research in the areas of pay TV, satellite broadcasting, and consumer video, and all our findings show that the consumer is interested in new technology only as a means to access new or better program material and not as an end in itself.

Rod Allen  
London Weekend Television  
London, England



### DESKPRO SERVICE PROBLEMS

I wholeheartedly agree with Alfred Poor's evaluation of both the Compaq Deskpro 286 and the Portable 286 ("High-Performance Alternatives to the PC AT," *PC Magazine*, Volume 4 Number 23). As a consultant I've recommended the purchase of four Deskpro 286 machines. However, Compaq's support is worthy of comment.

A hardware offering as superb as the 286 deserves much more support from the manufacturer than it is receiving. I've tried to find information not available in the machine's accompanying materials. Calls to the Computerland stores closest to me produced statements of noncooperation because the unit hadn't been purchased from them. Compaq directed me to contact its "authorized" dealer for information with the assurance that the dealer was, indeed, obligated to furnish such information regardless of origin of purchase. Only after considerable pressure did Compaq finally answer the questions I had.

My clients and I do not object to the idea of paying a premium price for Compaqs, but that price should also be accompanied by a level of support that at least matches other companies' offerings.

J. O'Loughlin  
Huron, Ohio

### SPECTRUM GAME BOOT

I too ran into the problem you noted with the Genoa Spectrum about self-booting game programs' not being able to make the Spectrum shift mode ("Genoa and Paradise: A Superset of Graphics Standards," *PC Magazine*, Volume 4 Number 26). I bypassed this problem by reconfiguring the Spectrum to boot up in colorgraphics emulation mode and put 'SM MT' (switch modes to monochrome text) in my AUTOEXEC.BAT file.

Bob Levittan  
Halesite, NY

### IN DEFENSE OF THE 8088

I must take issue with Ron Jeffries's declaration that the 8088 chip is D-E-A-D (Quantum Leap, *PC Magazine*, Volume 4 Number 22). PCs based on the 8088 are still selling very well, so I can't imagine IBM pulling this chip away from apparently satisfied customers. Besides, the 8088 is cheap, reliable, and compatible with just about every piece of PC software ever written. It may be a little slow for power users, but an 8088-powered PC is adequate for most users, especially with a reasonably fast 20-megabyte disk in tow. Though I appreciate Jeffries's interest in better personal computers, the 8088 provides plenty of power for the price.

Todd Natkin  
Washington, D.C.

### HOW TO WRITE TO PC MAGAZINE

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine*? A question you'd like to open up to other readers? Then write, preferably on-disk, to Letters to PC Magazine, *PC Magazine*, One Park Ave., New York, NY 10016. We are not able to answer letters personally. All letters become the property of *PC Magazine* and are subject to editing. We cannot print letters that do not include a name and address. ■

# Make Stat Magic

MORE! POWER!  
STATS IMPROVED!  
FILE HANDLING,  
REPORTING

## Statistics, reports and plots happen magically with SPSS/PC+ —the enhanced and expanded Statistical Package for IBM PC/XT/AT's\*

SPSS/PC+ is the most comprehensive statistical program for performing simple or complex tasks. For nearly 20 years, SPSS Inc.'s reputation and reliability as the leading producer of mainframe statistical and reporting software is unsurpassed. SPSS/PC+ carries this reputation into the PC environment.

SPSS/PC+ —Fully integrated: report writing, plotting, file management, communications with mainframes. Statistics: descriptives, crosstabulation, multiple regression, ANOVA. Simple facilities allow transfer of files between SPSS/PC+ and programs like Lotus 1-2-3, dBASE III, and SAS.\*

SPSS/PC+ Advanced Statistics\* — Factor, cluster, discriminant and loglinear analyses, MANOVA.

SPSS/PC+ Tables\* — Presentation-quality tabular reporting. Produce stub and banner tables. Handle multiple response survey data. Control content and layout completely.

SPSS/PC+ documentation is rated Number One by both novices and experienced analysts. SPSS Inc. also offers a full training schedule and a customer support hot-line.

To order, contact our Sales Department at

**312/329-3500**

SPSS Inc., 444 N. Michigan Avenue,  
Chicago, IL 60611, 312/329-3500.  
In Europe: SPSS Europe BV, 4200 AC  
Gorinchem, The Netherlands,  
Phone: +31183036719.  
TWX: 21019.



## SPSS Inc. PRODUCTIVITY RAISED TO THE HIGHEST POWER

\*SPSS/PC+ runs on the IBM PC/XT/AT with hard disk. Contact SPSS Inc. for compatible microcomputers.

IBM PC/XT and PC/AT are trademarks of International Business Machines Corporation. dBASE III is a trademark of Ashton-Tate. 1-2-3 is a trademark of Lotus Development Corporation. SAS is a registered trademark of SAS Institute, Inc. SPSS, SPSS/PC+, SPSS/PC+ Tables, and SPSS/PC+ Advanced Statistics are trademarks of SPSS Inc. for its proprietary computer software.

# "Dac-Easy Accounting is a genuinely amazing deal."

PC Magazine, October 15, 1985

"I've never before in a review come right out and told readers to buy a product, but I'm doing it now. Dac-Easy is an incredible value."

PC Week, August 27, 1985

"Amazing." "Incredible." That's how the industry's most important reviewers describe Dac-Easy Accounting.

Dac-Easy gives you seven full feature accounting modules in a single integrated package with instant access to General Ledger, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting. Imagine, you can generate over 300 reports from 80 different routines...all in a non copy-protected package. And, with Dac-Easy you'll get a handsome slipcase binder with easy-to-follow documentation. Best of all, Dac-Easy Accounting can be used to manage either service or product oriented businesses.

Find out for yourself why Dac-Easy is the fastest-selling accounting package on the market. Compare Dac-Easy's features against other packages costing thousands more. Then, order your Dac-Easy Accounting by calling our toll free number or returning the coupon below.

**Dac-Easy Accounting**  
**\$69.95**

"Dac-Easy is remarkable, amazing, revolutionary, sensational"

Computer Buyer's Guide & Handbook,  
September 1985

"EDITOR'S CHOICE"  
PC MAGAZINE

"Despite its low price, Dac-Easy includes a lot of extras that you wouldn't expect to find even in a more expensive package." PC Magazine, October 15, 1985

"This is an incredibly good value."

InfoWorld, September 23, 1985

Rated 4



### 30-day money back guarantee

Dac Software offers an unconditional guarantee on Dac-Easy Accounting. (Less postage and handling.) There is a \$10 restocking fee if the disk is opened, used or damaged.

Minimum Hardware Requirements:  
8MHz (PC), PC-370, or AT, or other compatibles 128K memory, one 5 1/4" 360K floppy disk, 128 column printer in compressed mode, 80386, CRT, MS-DOS® PC DOS® 2.0 or later.

®Trademarks of International Business Machines Corp.

™Trademark of Microsoft Corporation.



Call toll free or  
return coupon below today.

**1-800-992-7779**

Ask for operator #103

In Texas or  
for more information call  
**214-458-0038**

® Dac software, inc.  
4801 Spring Valley Rd. Building 110-B  
Dallas, TX 75244

Please rush me \_\_\_\_\_ copies of Dac-Easy Accounting. I've enclosed \$69.95 for each copy of Dac-Easy Accounting plus \$7.50 for postage and handling. In Texas, add 6 1/4% sales tax (\$4.28). U.S. prices only.

Check     Money Order  
 AMEX     VISA     MASTERCARD

Expires \_\_\_\_\_

Account No. \_\_\_\_\_

Name \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Signature \_\_\_\_\_

Call 1-800-992-7779 FOR  
IMMEDIATE RESPONSE

**Dac-Easy Accounting**

#103

### PARTIAL LIST OF FEATURES

#### General Information

- Mass mailing lists
- Payment protection
- File capacity limited only by disk space
- Support contract available

#### General Ledger

- Unlimited multi-level accounts
- Three-year partial history for CRT Inquiry
- Facility to print ledger to correct mistakes
- Unique budgeting routine
- CRT transaction inquiry
- Activity report, trial balance, financial statements, unlimited departments and journals

#### Accounts Receivable

- Open invoices or balance forward
- Customized aging report
- Unlimited number of customers
- Flexible mailing labels and directories
- Supports partial payment & finance charges
- Three-year partial history for number of invoices, sales, costs, and profits
- Customized statements
- Cash flow analysis/sales analysis
- Automatic sales forecasting

#### Accounts Payable

- Checks can contain multiple invoices and cash available routines
- Aging reports with seven customized columns
- Unlimited number of vendors
- Flexible mailing labels and directories
- Three-year vendor history
- Unlimited allocations per invoice

#### Inventory

- Standard average, last purchase, and standard costing methods
- Powerful physical inventory routines
- Accepts any unit of measure
- Three-year product history in units, dollars, cost and profits
- Automatic forecast of product sales
- Item and vendor assignments
- Alert and inventory reports with 11 sorts
- CRT shows on-hand or order-committed sales cost profit turns GROS!

#### Purchase Order

- Inventory and purchase inventory items
- Up to 99 lines per P.O.
- Per line discount is supported
- P.D. accepts general discounts freight taxes insurance
- P.O. accepts back orders and returns
- Purchase journal

#### Selling

- Sales or inventory invoicing on plain or preprinted forms with remarks
- Prints sales journal
- Allows return credit memo

#### Forecasting

- Unique program that automatically forecasts using your
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost and profit
- Inventory item usage
- Forecast by same as last year, or % base from last year, or trend, or linear square trend line analysis method.



## NUMBER SMASHER™

**Triple your PC speed for only \$799!**

### 8087 Upgrades™

MicroWay is the world leader in 8087 support. Our 8087 development software has been in use since 1982. By 1984 we had become Intel's 97th largest OEM account. When you buy from us, you can be confident that you will receive the 8087 chip designed for your PC and that our unique diagnostics will instantly verify that your processor works correctly as installed. Call for current prices.

### 287Turbo™

This card plugs into the 80287 socket on your AT or COMPAQ, doubling the 80287 clock from 4 to 8 MHz. It does not change the 80286 clock speed or affect your warranty. The card comes with an 8 MHz 80287 and has provisions for faster crystals as better 80287s become available. It also has a reset button and circuit that provide a hardware alternative to CNTRL-ALT-DEL. 287 Turbo with Diagnostics and Reset ..... \$395

### Number Smasher™

Number Smasher gives you AT speed and 100% compatibility with all PC software and hardware. It comes with a 10 MHz 8086 and 512K of no wait state RAM. Most are shipped with an optional matched 10 MHz 8087 and 128K daughterboard. The card runs programs a factor of 2.5 to 4.0 faster than the PC, XT or compatibles it runs in. Other features include FASTROM, a Ram Disk, Print Spooler and Disk Cache. Revision 2 of the Smasher is designed and manufactured by MicroWay in the U.S.A. and has the best service and support of any accelerator card.

### MegaPage™

MicroWay's "Lotus/Intel" extended memory card has all the features of the others plus one; it uses low power, cool running CMOS DRAM. Ask for our pamphlet "Extended vs Expanded Memory" and learn why MegaPage is the right card for you. MegaPage with 2 Megabytes CMOS ..... \$549

**Micro  
Way**

*The World Leader in 8087 Support*

P.O. Box 79, Kingston, Mass. 02364 USA (617) 746-7341  
Tempo House, London, U.K. call 01-223-7662

Number Smasher, MegaPage and 287Turbo are trademarks of MicroWay, Inc. MicroWay is a registered trademark of MicroWay, Inc.

CIRCLE 159 ON READER SERVICE CARD



# Our professionals

If you seriously shop around for the best priced computer hardware, software, and services, you've probably talked product and price with a PROGRESSIVE MICRO DISTRIBUTORS' professional. If you haven't, you've been depriving yourself and your company of a beautiful professional relationship. Here's why.

## **WE MEAN BUSINESS.**

By focusing on details, PROGRESSIVE MICRO DISTRIBUTORS provides business buyer's with the criteria needed to make informed purchasing decisions. Our professionals give you expert advice on current computer and peripheral applications. Quote you prices that make good business sense. Inform you about specials on overstocked items. Make sure that each system is burned-in and fully tested overnight before being shipped. And follow your order from the moment it's processed until it reaches its final destination.

Furthermore, if a problem does occur, you won't be left dangling. Direct access to our customer service and technical support centers is available daily. Whether you need a product repaired or replaced, factory authorized technicians and customer service specialists are standing by to quickly resolve any problems you might experience.

## **HOW TO KEEP UP WITH PROGRESSIVE.**

It's easy. With the Microgram, our monthly customer newsservice, you'll gain insights on new products and receive money saving incentives. And we'll keep you posted on specials and current prices with our monthly price lists. Lists are shipped automatically with all system orders and are available on disk. In addition, FREE UPS shipping is guaranteed on all prepaid orders with confirmation of current pricing.

To receive your current price list immediately, just call PROGRESSIVE MICRO DISTRIBUTORS today. TOLL FREE 1-800-446-7996. And remember... for professional services every time, call the professionals at PROGRESSIVE MICRO DISTRIBUTORS.



## **POLICIES**

1. We accept VISA, MC, AMEX. No surcharge for VISA or MC.
2. COD requires cash or certified check; Company check when approved.
3. Allow 1 week for personal and company checks to clear.
4. Wiring information available upon request.
5. Corporate, Government and Institutional volume purchase agreements available.
6. Call for exact shipping charges; air shipments take priority.
7. If we must split shipment, you incur no additional shipping charges.
8. All orders shipped insured — No additional charge.
9. All products fully warrantied; Some up to 6 years.
10. All items subject to availability; Prices subject to change without notice.

## **FOR ORDERS**

**1-800-446-7995**

## **CUSTOMER SERVICE**

**1-404-446-7996**

## **ORDERING INFORMATION**

**1-404-446-7995**

## **TECH ASSISTANCE**

**1-404-446-7997**

HRS: 9AM-9PM EST. SAT. 12N-5PM EST.

©1985 APMT Information Systems  
IBM is a registered trademark of the International Business Machines Corp.

# make us Progressive.

## PC SYSTEMS

### AT&T PC 6300

640K, 2 drives, ser, par, DOS-BASIC

640K, 1 drive, 10MB, ser, par, DOS-BASIC

640K, 1 drive, 20MB, ser, par, DOS-BASIC

### AT&T PC 6300 PLUS

1MB RAM, 1 IBM floppy, 20MB hard disk, mono monitor, serial & parallel ports, keyboard, display adapter

**IBM PC XT**

256K, 2 drives, monochrome printer adapter

8" monitor

256K, 2 drives, color/graphics adapter & monitor

256K, 2 drives, 10MB internal hard disk

256K, 2 drives, 20MB internal hard disk

### IBM PC AT

256K, 1.25 MB floppy

B12K, 1.2MB & 360K floppies, 20MB

**MULTITRONIC PC Turbo**

4.77" 800K, 640K, serial, parallel, 2 360K floppies, monochrome with monitor, DOS

These systems have now shipped fully tested and

burned in, fully warranted for ninety days AND ARE

ALWAYS IN STOCK! ALL system orders include our

PC Utilities Package at no extra charge!

## PRINTERS

### EPSON

FX-85 (160 cps narrow carriage NLQ dot matrix)

FX-185 (160 cps wide carriage NLQ dot matrix)

LX-90 (120 cps, NLQ dot matrix)

LQ-1500 (1Q dot matrix w/parallel interface)

DX-10, 20, 35 (new EPSON daisywheel)

ON SPECIAL!!

### OKIDATA

MJ-1500 (160 cps narrow carriage dot matrix)

MJ-1500 (160 cps wide carriage dot matrix)

PACEMAKER 2410 & 360 cps wide carriage

dot matrix

### CANON

LBP-5A1 (8 ppm, better than HP)

PW-1060A (160 cps dot matrix)

PW-1060A (32 cps color printer)

### TOSHIBA

P-351 (192 cps wide carriage LQ dot matrix)

P-1340 (120 cps narrow carriage LQ dot matrix)

**TEXAS INSTRUMENTS**

TI-855 (150 cps narrow carriage LQ dot matrix)

### BROTHER

M-1500 (160 cps, wide carriage NLQ, Dot Matrix)

HR-15 + (17 cps narrow carriage letter quality)

HR-25 (32 cps wide carriage letter quality)

HR-35 (32 cps wide carriage letter quality)

### C. ITRON

Starwriter (40 cps letter quality)

Printmaster (160 cps letter quality)

ON SPECIAL!!

## PLOTTERS

We carry all HOUSTON INSTRUMENTS and HEWLETT-PACKARD plotters

## FLOPPY DISK DRIVES

HALF HEIGHT 360K (PC XT/AT compatible)

HALF HEIGHT HT 1.2MB (PC XT/AT compatible)

## MISC. HARDWARE

POLAROID Palettes (Makes color slides from your PC's screen)

ON/Off switch for power supply

ON/Off switch for power supply

KEYTRONIC KB 5151 & 5153 keyboards

MOURE SYSTEM MS Optics PC MOUSE w/PAINT

MICROSOFT Serial or Bus mouse w/ Mouse Menu

GIG Board Upgrades (SPS & UPS)

QUADRAM Microfaser Printer Buffer

CURTESY System accessories

ON SPECIAL!!

CALL FOR QUANTITY DISCOUNTS

## CHIPS

64K (nine chips)

128K (AT RAM)

5007-3 (coprocessor)

506K (JR & AT boards)

80287 (coprocessor)

ON SPECIAL!!

## HARD DISK DRIVES

### Internal

PC XT 10MB

AT 20MB

PC XT 30MB

AT 30MB

PC XT 50MB

AT 60MB

### External

AT 10MB

AT 140MB

AT 190MB

AT 240MB

PC XT 10MB

PC XT 20MB

PC XT 30MB

PC XT 50MB

PC XT 60MB

We proudly offer what we think are the best

prices/performances hard disks, and we carry the

sub-systems needed to make them work. If you

want a disk we sell at a nominal charge. Our line

includes ALLOY, BRUNNHOFF TECHNOLOGY, CIPHER

DATA, DMA, EMERALD SYSTEMS, EPSON, GENOA,

IRWIN, MAXTOR, PEACHTREE TECHNOLOGIES,

PIRAM, QUADRAM, RODIMB, SYGNET, TALLORASS,

TULIN and WANGTRON

We carry the finest quality multifunction boards at

prices too low to mention. We are factory authorized

centers for the top names in the industry. Our volume

buying allows us to set the most competitive prices

anywhere. Call us for the lowest prices & full service

distributor can give you

## MULTIFUNCTION BOARDS

Sta Pak w/64K (64 384K, s/p, C/C, opt game)

Advantage (AT compat, memory expansion

options)

Quadrastar (64K (64 384K, s/p, game, C/C))

Quadrastar (AT w/p, opt, 4 more serial)

Liberty (EMM board plus)

We carry the finest quality multifunction boards at

prices too low to mention. We are factory authorized

centers for the top names in the industry. Our volume

buying allows us to set the most competitive prices

anywhere. Call us for the lowest prices & full service

distributor can give you

## GRAPHICS CARDS

We carry a variety of display adapters. So, call us if you

don't see the one you want or need help choosing

the right one.

**GENOA**

Spectrum (High res color & Mono)

**SIGMA**

Color 400

**HERCULES**

Graphics Card : Lotus compatible monochrome

graphics)

Color Graphics Card (Short stick color card w/par)

**PARADISE**

Module Graphics Card & Multi Display Card

**TECMAR**

Graphics Master (640x400 1B colors and

monographics)

**PERSTY**

Paradise (short stick color card)

**TSING LABS**

UltraPAK (130 col. mono graphics, ser, par, C/C.)

**MONITORS**

**AMDEK**

3000 & 300A (Green or Amber,

composite video monitors)

310A (Amber TTL input, non-glare tube)

**COLOR 600** (13" 640x240 RGB W/TEXT/VIDEO, audio)

**COLOR 13** (13" 640x240 RGB W/TEXT/VIDEO, 31mm dot)

**COLOR 15** (15" 640x400 RGB, non-glare, flicker)

**PRINCETON GRAPHICS**

PGS MAX-18 (TTL input, non-glare tube)

**PGS HX 12** (640x480 505 w/ 31mm dot)

**PGS SS-12** (690x480 non-interlaced RGB w/ 31 dot)

**QUADRAM**

Amber/white (TTL monochrome)

Quadrastar (690x480 31mm dot pitch)

Quadrastar II (same as IBM Color Monitor)

**TAXAN**

630, 640

We carry Wyse and Kimtron terminals, call for prices

## PROTOCOL CONVERSION

We carry all AST and DCA products, call for prices

## MODEMS

### HAYES

Hayes 1200 (external 300/1200, auto answer/hold)

Hayes 1200 (internal 300/1200, w/Smartcom 31)

Hayes 2400 (New external 9600 baud modem)

**DCA**

DCA FastLink 10KB modem

From \$1995

**ANCHOR AUTOMATION**

Regalman Mark XII (1980 board at 300 baud price)

We also carry modems by AST RESEARCH, RICOHMP,

PENRIL, QUADRAM, RIXON, VENTEL please call for

curent pricing

## NETWORKING

We carry all the best names including 3COM, AST

RESEARCH, FOX, IBM, and ORCHID TECHNOLOGIES Call

our Networking Applications experts to design a cost-

effective device sharing networked layout for your office

Regional On Site installation and training available

## C.A.D.

We sell and support the finest computer aided drafting

design packages available. Regional On Site installation

and training available

## DISKETTES

### BASIC, 3M & XIDEK

Double sided/Double density

16/814

100/1189

### BASF

(High Density) ..

10/1488

100/1646

### MAXELL

High density AT diskettes

10/1489

100/1647

## SOFTWARE

### LOTUS 1-2-3 (version 2.0)

LOTUS Symphony (New Version)

\$499

MICROSOFT Excel

\$CALL

MICROSOFT Project

\$CALL

ASYSTANT STATE Framework II

\$499

SHOOTER (DOS) Version 3.0

\$199

SHOOTER (DOS) Version 4.0

\$299

SHOOTER (DOS) Version 4.0 Zero Disk

\$CALL

CENTRAL POINT Copy II PC copier prot. soft.

\$895

EASTBACK by 3rd Generation

\$129

GRAPHITE Printworks toolbox utilities

\$99

GOBIERNE Disk Editor and Superkey

\$CALL

DGRLLN Turbo Lightning and Reflex

\$CALL

F-18 STRIKE EAGLE (F 18 fighter simulator)

\$199

EFIX Winter Games

\$199

HAYDEN Sargon III

\$199

GATO

\$CALL

HLUBOGIC Jet (Land or carrier based flight-game)

\$199

SIMON & SCHUSTER Typing Tutor III

\$199

MATH BLASTER

\$CALL

NETPACK

\$CALL

SPELLIT

\$CALL

PEACHTREE SOFTWARE Back-to-Basics

\$CALL

**PROGRESSIVE MICRO DISTRIBUTORS**

3039 Amwiler Road, Atlanta, Georgia 30360

# Get your data in shape.



## Introducing 1-2-3 Report Writer.<sup>TM</sup>

Now you can get customized reports and forms right from your 1-2-3<sup>®</sup> database files.

With 1-2-3 Report Writer,<sup>a</sup> a separate, stand-alone product, you can create and print professional looking documents in minutes. You can use 1-2-3 Report Writer for personnel

reports, sales analyses, claim forms, invoices, purchase orders, and even mailing labels.

You select the data you want to see and see it the way you want it. Emphasize a point with an underline, italics or a bold heading. Change field names, widths and formats simply by using a cursor key. Or insert multi-line headers and footers, delete unwanted fields, and sort on up to four levels.

1-2-3 Report Writer can even do your most common calculations: averages, totals, subtotals, counts and minimums/maxima. And customized formats can be saved for generating periodic reports with updated information.

If you're familiar with 1-2-3,

you'll immediately feel comfortable with 1-2-3 Report Writer. Similar menus and prompts guide you until you have exactly the report you want. It's that easy.

If you'd like to make your database look better, look at 1-2-3 Report Writer from Lotus<sup>®</sup>. For more information, see your local authorized Lotus dealer. Or for a demonstration of 1-2-3 Report Writer, send \$5.00 along with your name and address to 1-2-3 Report Writer Demo Disk, Dept. NC, P.O. Box 4036, Woburn, MA 01888.

**123** Report Writer

**Lotus**

1-2-3 Report Writer creates files created by 1-2-3 Release 1.0 and Release 2.0. 1-2-3 Report Writer 1.0 and release 1.1. Suggested retail price is \$5.00. ©1985, Lotus Development Corporation. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. 1-2-3 Report Writer is a trademark of Lotus Development Corporation.

## ■ EDITED BY GUS VENDITTO

# PC ADVISOR

*The PC Advisor enhances your productivity by helping you choose the best hardware and software products to meet your specific needs.*

**FROM BAR CODES TO PIE CHARTS**

My Printronix 150L printer is very versatile with the programmable graphics board installed. However, I would like to make the escape codes compatible with either the IBM or Epson printers in order to do 1-2-3 graphics, dump screens, and so forth.

Please advise me on how to go about doing this. I have no knowledge of assembly/machine language.

Steve Brown  
Ontario, Canada

*Machine language won't help you here. The obstacle is in your printer, which was designed to produce bar codes. It is very similar to other ASCII-compatible graphic printers with two exceptions: It has a smaller dot size to produce the thin lines needed for universal product codes (UPC) and its PROM (programmable read-only memory) chip does not include the higher ASCII codes needed to produce the kind of graphics you want.*

*You might get acceptable graphics by running the PRSWAP program written by PC Magazine editor John Dickinson for the September 17, 1985, Programming column (Volume 4 Number 19). It uses letters to mimic ASCII graphics characters.*

*But you really should take advantage of new PROM chips offered by Printronix (Irvine, CA 92713; (714) 863-1900). It has replacements for the three PROM chips in the 150L. These control the fonts, the mechanics, and the logic interface. The latter, called the DCU, decodes input from the PC. A new DCU (Version 50.63; list price, \$50; part # 117160-001) should*

*give you IBM graphics compatibility. However, depending on how old the printer is, you may need to replace the other two chips, so that they'll understand the new data; your local distributor will be able to help. But the first step is to replace the DCU chip.*

**ADDING RAM TO A COMPATIBLE**

I own a Zenith Z-150 PC. I read in another publication that you can make a memory upgrade directly to the Z-150 motherboard using 256K chips and so save buying an additional board and/or using 64K chips. Is this true? If so, please advise me of a publication or supplier I could consult.

Andre Brunskill  
Des Moines, Iowa

*The 64K- and 256K-bit RAM chips sold by many dealers, including the mail-order services that advertise in the pages of PC Magazine, are compatible with your Z-*

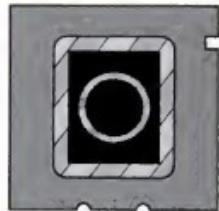
■ The 64K- and 256K-bit RAM chips sold by many dealers are compatible with your Z-150 and just about all IBM PC compatibles.

*150 and just about all IBM PC compatibles. We recommend using 64K chips because your Z-150 has a PAL (programmable array logic) chip programmed to accept 64K chips; it must be replaced if you upgrade with 256K chips. Also, the motherboard, which comes with 128K bytes of RAM, can recognize only a total of 320K bytes (any additional memory up to a total of 640K bytes must be on an expansion board); if you use 256K-bit chips, you're wasting 64K. The cheapest, easiest memory upgrade you can make is with three sets of 64K chips, for a total of 320K bytes of RAM.*

*By the way, 64K-bit chips usually come in sets or banks of 9 (8 bits in a byte, plus an extra chip for the parity bit); they should cost about \$4-\$6 a set. Plugging them in on the motherboard is a simple enough affair, no special tools are required. Just be sure you read the section in your manual on adding chips. You will have to change the settings on the board's DIP switch; the manual shows how.*

*If you feel uncomfortable with the bare-bones assistance offered there, buy one of the books offering guidance in tinkering with your PC's innards. A good one is The Plain English Maintenance & Repair Guide for IBM Personal Computers, by Henry Beechhold (Computer Book Division, Simon & Schuster, New York, NY 10020; ISBN, 0-671-52864-5; list price, \$14.95); it covers compatibles, too.*

**ASK FOR ADVICE** Send your questions to PC Advisor, PC Magazine, One Park Ave., New York, NY 10016. ■





If you're still paying for multiple copies of dBASE or RunTime<sup>®</sup> at hundreds of dollars a pop, you can stop.

And use a WordTech compiler instead.

With a WordTech compiler, you only need a single copy of dBASE II<sup>®</sup> or dBASE III<sup>®</sup> for every programmer, not every user.

Then you can distribute as many copies of your compiled (and protected) programs as you want with no site licenses, no runtime fees and no strings attached.

Our MS-DOS compilers typically run your dBASE applications 3 to 10 times faster and use just 128K of free memory on any MS-DOS computer, not only the IBM PC.

You don't pay any penalties because WordTech compilers use the same language and syntax as dBASE and the same index, memory and data files (up to 10 data files open simultaneously, each with up to 7 indexes).

# Still using dBASE?

And you don't pay the usual high price because WordTech compilers are just \$750. Once.

With a WordTech compiler, you can also run your programs on multi-user and networked systems. Our multi-user compiler runs your existing dBASE programs under AT&T's UNIX System V or CROMIX. And our networking compiler runs your present code on

DOS 3.1 local area networks (LAN's). The compiler will take care of file and record locking for you, or you can take full control using dBASE III networking commands.

We can help you extend your applications as well as your budgets. You can do windows with dBFrame<sup>™</sup>,

+ business graphics with dBChart<sup>™</sup> and even replace dBASE itself for just \$169 with dB-XL<sup>™</sup>, an interpreter with an extended superset of the dBASE III language.

And we back everything with free support, one year of maintenance and a money-back guarantee.

For details and the name of your nearest dealer, contact WordTech Systems, Inc., P.O. Box 1747, Orinda, CA 94563. (415) 254-0900. TELEX 503599.

You owe it to your wallet to call now.



**WORDTECH  
SYSTEMS**







**CALL TOLL FREE 1-800-382-2242**

# NORTHE Software

88 Ryders Lane, Stratford, Connecticut 06497

See Below

**WE WILL BEAT**

1. Top our unmatched selection and inventory of software/hardware for the IBM PC (as well as the Mac and Apple and Commodore Amiga).
  2. School and corporate purchase orders are welcomed. CALL 1-800-874-1108.
  3. Special/rush orders. If something you need is not listed, hard to find, or needed in a hurry, CALL 1-800-874-1108.
  4. Order Status. CALL (203) 375-3860.
  5. FREQUENT PURCHASER PROGRAM. Effective 10/14/85, any repeat customer who has placed an order after 9/4/85 will automatically receive \$1 off any order he or she places with us. Please mention to your operator that you are a repeat customer. We value your continuing business. Send in \$1,000 worth of invoices (representing previous purchases) and you will receive a coupon worth 1% off any future purchase. With \$5,000 worth of invoices, receive a coupon worth 5% off any future purchase.
  6. SOFTWARE RENTAL LIBRARY. For 25% of our price, rent any program for two weeks. Apply your rental fee toward purchase if you choose.

- 7. No additional charges for credit card orders.
  - 8. Convenient hours. 7 days/week:  
9 AM-11 PM EST.
  - 9. Technical experts on duty.
  - 10. **FREE AIR EXPRESS SHIPPING.** Purchase \$150 or more of software and for no additional charge we will ship your products by air courier. Mention this to your operator as you place your order.

- 11. FURTHER DISCOUNTS BY MAIL.** Circle the items in our ad you want, send the ad in with the coupon below and receive \$5.50 off each item! Cut out a competitor's ad with a lower price and we will give you \$1 off his price (subject to the conditions below).

#### SPECIALS

ACCESSORIES

MODIEM

10

BUSINESS SOFTWARE

<input type="checkbox"/>	Send me more information and let me know about	<input checked="" type="checkbox"/>	DISCOUNT BY MAIL DEPARTMENT
Northern States, 85 Ryerson Lane, Stamford, CT 06907			
To be eligible for the \$5.50 per item discount you must:			
1 Fill out form.			
2 Send it in with the items you desire ordered.			
<b>Name:</b> _____			
<b>Address:</b> _____ City: _____ State: _____ Zip: _____			
<b>Phone No. or office address:</b> _____			
<b>Check four of payment:</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
West	Money Card	C.O.D.	Personal Check
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central/Credit	Money Order		
<b>Card No.</b> _____		<b>Exp Date</b> _____	

240



# How to Save Money ...

## IBM PC SYSTEMS



### MAINSTREET ENHANCED PC \$1965

with 10 MB Disk

Same System with  
20 MB Hard Disk

**\$2085**

Monitor sold separately

Many Options Available

- 360kb Tandon Floppy
- 10 MEG ADEPT Hard Disk
- 256K RAM
- All Controllers, Cables, Manual
- 1 Year Warranty

## IBM PC/AT SYSTEMS

### MAINSTREET

### AT PLUS

**\$4030**

20MB System  
Includes:

- 1.2 MB Floppy
- 360 KB Floppy
- 512K RAM
- 20 MB Hard Disk
- Serial/Clock
- All Cables, Controllers, Manual



Same System  
with 32 mb

**\$4241**

Monitor sold separately

## MORE IBM PC SYSTEMS FROM MAINSTREET

### SUPER PC \$2644

- 256K RAM
- 360K RAM
- 10 MEG
- 10 MEG
- 256K RAM
- 10 MEG
- 20 MEG HARD
- Tape Backup

### SUPER PC+ \$3070

- 256K RAM
- 360K RAM
- 10 MEG
- 10 MEG
- 256K RAM
- 10 MEG
- 20 MEG HARD
- Tape Backup

### Slot Saver \$2601

- Tape Drive
- 135 Watt
- 640K RAM
- AST 6 PAK
- 135 Watt
- Power

### CP 2/20 \$2145

- 256K RAM
- 2 360K Floppies
- 20MB Hard Disk

SET OF NINE  
64K - **\$8**  
256K DRAMS

256K - **\$35**

AB07-3 - 999 AB07-2 - 6140  
80267 - 5256

## Printers

EPSON FX-85	CALL
EPSON LQ-1500	\$929
EPSON FX-185	\$499
EPSON LX-80	\$229
TOSHIBA 1340	\$569
TOSHIBA 351	\$1899
TOSHIBA 1351	\$999
TOSHIBA 341	\$939
NEC E-1+F	\$449
CITIZEN MSP-10	\$299
OKIDATA 182	\$239
OKIDATA 192	\$349
OKIDATA 193	\$549
OKIDATA 84	\$759

## BACK-UP POWER

### ADEPT™

- |                         |       |
|-------------------------|-------|
| DataShield AT 800       | \$695 |
| Back-up power 100 Watts |       |
| DataShield PC 100       | \$285 |
| DataShield AT 500       | \$559 |

## SURGE Protection

- |                        |      |
|------------------------|------|
| DataShield 100P        | \$39 |
| DataShield 100S        | \$49 |
| DataShield ST9         | \$36 |
| Kensington Masterpiece | \$95 |
- Computer Accessories

TO PLACE YOUR ORDER CALL

**1-800-426-MAIN**

## COMPAQ

**20 MB  
System**

**\$2942**

Tape Back Up  
10 MB \$599  
20 MB  
\$739

- FAST 8086 Processor
- 640K RAM
- 20 MB Hard Disk
- 2 - 360kb Floppy
- High Resolution Monitor

■ 1 Year Warranty

## SHOCK-MOUNTED 10 MB

For  
Compaq  
**\$475**

**COMPAQ Portable** \$2689  
**\$2466** With 20MB

256K, 360KB Floppy, 10MB Hard Disk 20 MB **\$4664**



HOURS: 9am to 6 pm CST M-F Sat 9-3

**ORDERING INFO:** All Mail: 1025 Main St., Bastrop TX 78602  
We accept personal and corporate checks. No delay if driver's license and expiration included. Shipping is free on prepaid orders via UPS Ground. Air is extra. We accept VISA, MC (Am Exp and Diner's Club - 3% surcharge) We double manufacturer's warranty on all hardware. Software is not returnable. All goods are new.  
TELEX 5106007038 MAINSTREET UQ

# Buy Mainstreet and Adept

## ADEPT™ PC



**\$749**  
ADEPT™  
Personal  
Computer

Same System  
with 20MB  
**\$1239**

30 Day Trial / 100% Credit  
Towards IBM PC

- 640K RAM
- 360Kb Floppy
- "Touch Type" Keyboard
- 1 Year Warranty
- Runs IBM™ Software

Monitor sold separately

## ADEPT™ AT

**\$1975**  
ADEPT™ AT

- 80286 Microprocessor
- 1.2 MEG Floppy Drive
- Hard Disk Controller
- "Touch Type AT" Keyboard
- Runs IBM PC, XT, AT Software
- 8 Full Size Expansion Slots
- 1 Year Warranty

Monitor sold separately



Add 20MB Hard Disk  
For Only \$490

"Our #1 Seller"

### Quick-Six Multifunction Board

**\$139**

Includes SIDEKICK!  
\$34.95 Value Free

For A Limited Time

- Serial Port
- Parallel
- 384K RAM
- Clock/Calendar
- RAM Disk Software
- Print Spooler

**MONO/GRAFICS  
BALANCE I**  
**\$229**

- 720 x 348 Resolution
- Parallel
- Runs 1-2-3

**Balance II**  
**\$299**

Mono/Color Graphics

### HIGH SPEED TAPE BACK-UP

**\$739**  
20MB

Backs up 20 MB in  
less than 10 minutes

**60 MB**

**\$899**

Similar to TECMAR  
QIC-60

### AT E-X-P BOARD

**\$289**

- 3MB RAM
- Serial Port
- Parallel Port
- For IBM or ADEPT AT

### HARD DISKS by ADEPT™

**20MB**  
**\$490**



- Half Height
- Complete System

**10 MB - \$390**

**32MB - \$695**

- Mounts Internally
- 1 Year Warranty

For really FAST access, call our  
hard drive specialist — 800-426-6246



**ADEPT™**

**10,20,32 MB From \$595**  
10 MB

### Combination Systems

24 Hour  
Bulletin  
Board  
Service

1 ROAD  
SIGNS

MAIL  
DOWNLOAD

ORDERING

502-321-7317

All New

Order Cards

502-321-9300

HARD DRIVE	TAPI	PRICE
10 MB G	10 MB G	\$1795
20 MB G	20 MB G	\$1995
30 MB G	30 MB G	\$1995
32 MB G	60 MB G	\$1979

A perfect match! Colors and cases  
to conform with your IBM or ADEPT  
PC. In two convenient models to suit  
your space requirements. Add hard  
drives in 10, 20, 32 or 60 megsabytes.  
Cartridge tape backup in 10, 20 or 60  
mebytes. Combine hard drive and  
tape backup for complete storage  
solutions. All units come with power  
supply, cables, software and manual.

CIRCLE 227 ON READER SERVICE CARD

### EXTERNAL STORAGE

**10,20,32 MB From \$635**  
10 MB

### Combination Systems

HARD DRIVE	TAPI	PRICE
10 MB G	10 MB G	\$1295
20 MB G	20 MB G	\$1495
30 MB G	60 MB G	\$1995
32 MB G	60 MB G	\$1979

### SOFTWARE

Many titles available 800 426-6246  
Call for Latest Version and Price

Examples: Borland Superkey \$35 Copy II PC Basic \$25

Multimate \$238 Norton Utilities \$49

**800 426-6246**  
**ORDERS**  
**512 321-4106**  
Technical Assistance  
Texas Residents, Inquiries  
Saturday: 9 am-1 pm

Mainstreet Computer  
1025 Main St.  
Bastrop, TX 78602  
Hours:  
Mon-Fri: 9 am-6 pm  
Saturday: 9 am-1 pm

1st Place  
Graphics  
Drawing Division  
1985 World Class PC  
Contest, PC World



# Don't Get Left Out of the Picture!

*Join the thousands who are drawing their way to the top  
with PC-Draw.*

Thousands have already discovered our proven ladder to the top. In fact, PC-Draw was voted the favorite graphics drawing package in *PC World's* prestigious 1985 World Class PC Contest. And captured a coveted ICP Million Dollar Award in the same year!

PC-Draw gives you the power to graphically depict your best ideas, plans, designs, and proposals. *In color or black and white.* Boldly. Powerfully. And then instantly print them with a broad range of printers and plotters.

You'll increase your productivity with quick and easy flowcharts, organization charts and diagrams. And enter meetings with your best ideas more forcefully presented than ever before. PC-Draw lets you create virtually anything that can be drawn with pencil and paper—quickly, easily, and with far greater detail. And you can instantly edit your drawings when updates are necessary, instead of starting from scratch!

PC-Draw runs on the IBM PC, XT, AT™ or compatibles. It's ideal for flowcharts, organization charts, presentation graphics...and an endless variety of graphs and illustrations. You can produce drawings up to 99 pages long. Common symbols are ready-made

for placement anywhere on the screen. Or generate and store your own unlimited supply of user-defined symbols. We even include special templates which speed some of PC-Draw's most popular applications, including Flowcharting, Electrical Design, Office Layout and Alternate Text.

As always, you'll get free technical support, and the service and reliability of a company that for years has been dedicated to designing the finest graphics software you can buy.

PC-Draw includes an *easy-to-follow* interactive tutorial. It requires an IBM PC or compatible, graphics adapter and graphics monitor (or IBM monochrome monitor and compatible monochrome graphics card). Graphics boards and light pens are available from Micrografx at excellent prices.

The word is out. So join your office competition on the ladder to the top—with award-winning PC-Draw.

**TO ORDER (or for free single-disk demo or brochure) CALL: 1-800-2PC-DRAW.** In Texas or for customer support call (214) 234-1769. Micrografx, Inc., 1820 N. Greenville Ave., Richardson, Texas, 75081.

## MICROGRAFX™

The Picture of Success.

CIRCLE 157 ON READER SERVICE CARD

(Most popular plotters and printers supported.)



# PC NEWS

FIRST LOOK: VP-PLANNER

38

NEWS IN BRIEF

43

PC UPDATE

46

COMMUNIQUES

56

## EGA Standard Evolves For PC Graphics Users

BY CHARLES BERMANT AND CHRIS JOHNSTON

**NEW YORK**—A year after its release, IBM's Enhanced Graphics Adapter standard is being emulated, improved, and made cheaper by more than a half dozen peripheral manufacturers.

The first EGA-compatible boards, most with additional features, were introduced at fall COMDEX; by spring at least eight should be on the market. Most add Hercules monochrome graphics emulation to the three IBM display types on the EGA card, and come with 256K bytes of memory. Some add a printer port or fit in a short slot.

IBM introduced the EGA in September 1984 in conjunction with the \$845 Enhanced Color Display, intending the pair to become the standard-bearer for higher resolution color/graphics. It gave PC users access to

16 colors at both 320 by 200 pixels (the original color/graphics standard) and 640 by 350 (enhanced color graphics), along with 640 by 350 and graphics in four shades of gray in monochrome emulation.

### Other EGA Boards

The new EGA boards range in price from \$495 to \$600, nearly undercutting IBM's \$982 list price for a comparable 256K-byte configuration. Most also emulate the 720 by 348 Hercules Graphics Card for monochrome monitors.

Boards will be produced by Video-7, Quadram Corp., AST Research, Atronix International, Genos, Paradise Systems, Tseng Laboratories, and Orchid Technologies. Several of the new EGA boards were to have been available by January. Later arrivals will come from AST, Tseng, Paradise, and Orchid.

(continued on next page)

### The New Enhanced Graphics Adapter Cards

Company & Product	Price	Hercules	Memory	Features	Available	Warranty
IBM: EGA (64K)	\$524		64K		✓	1 year
IBM: EGA (256K)	\$982		256K		✓	1 year
Video-7: EGA	\$599	✓	256K	Half card	✓	2 years
Quadram: QuadEGRA	\$595	✓	256K	MS Windows	✓	1 year
AST: AST-36	\$600	✓	256K	Printer port		2 years
Genos: Spectra-EGA	\$495	✓	256K	Printer port	✓	1 year
STB: EGA Plus	\$595		256K	Accelerator PC	✓	1 year
Tseng: Eva	\$580	✓	256K	Printer port		1 year
Atronix: Megagraph	\$499		256K		✓	1 year
Paradise: TBA	\$495	✓	256K	Half card		1 year

All boards emulate the original IBM Color Graphics (320 × 200 pixels), IBM Enhanced Graphics (640 × 300 pixels), and IBM Monochrome (640 × 350 pixels) adapters. All support a light pen interface.

## Reflex Adds Windows and New Analytic Capabilities

BY FRANK J. DERFLER

Borland International's new \$99.95 database management program, *Reflex: The Analyst*, is a product you should know about. In addition to being inexpensive, it is fast, very capable, and provides some views of data that you can't get out of the most popular DBMS products.

*Reflex's* greatest strength is

that you can see your records and fields laid out in columns and rows like a spreadsheet. You also can see simultaneously, in other windows on the screen, a record in tabular form, display derived cells such as totals or averages, or show various types of charts and graphs.

*Reflex* does a fine job of keeping records, updating them, and printing out the data in various

formats. But *Reflex* excels as an analytical tool, enabling you to contrast and compare the details of the information you have in the database and derive new information in statistical and graphic forms.

This program is fine for developing a mailing list or inventory, but its unique capabilities really shine when you need to perform tasks like graphing cus-

tomers by ZIP code or totaling the net present value of all inventory over 60 days old.

### A 1-2-3 User's Delight

*Reflex* is designed to appeal to people who are familiar with 1-2-3. Like 1-2-3, *Reflex* uses the Slash key to bring up a horizontal menu and will put extensive formulas into particular cells. 1-2-3 users will appreciate the fast graphing and charting function in *Reflex* and the familiar template for the special function keys. *Reflex's* pull-down menus efficiently display the currently useful menu

(continued on next page)

## EGA Standard

(Continued from preceding page)

Once they are available in quantity this spring, price-conscious buyers should be able to find an EGA card and matching color monitor for less than \$1,000, compared with \$1,827 list for the IBM pair.

The IBM EGA is also available in a bare-bones \$524 64K-byte version but, according to Video-7's chief executive officer, Don Bryson, "Customers who buy the EGA with 64K will end up wanting more within a few hours. With a 64K EGA, you're not getting full color, speed, or performance. Most of the specialty software written for the EGA needs 256K to run."

## EGA Chips

Memory chips that populate the EGA are more costly than memory chips found on a normal motherboard. They are 16K-byte by 4-bit chips (IBM) or 64K-byte by 4-bit (all others) instead of the 64K-byte by 1-bit RAM chips that are available for as little as \$10 in sets of nine.

Most of the EGA boards coming to market utilize a four-chip set from Chips and Technology of Milpitas, Calif. Tseng Laboratories is shipping a 3-chip set to OEM customers, and Paradise Systems is developing a single EGA chip for OEM use, as well as for an as-yet unnamed Paradise board available in April.

The new EGA boards are generally better equipped, re-

flecting the philosophy that a combination of lower price and more-versatile performance is the only way to beat IBM.

## Quadram and Video-7

Quadram of Norcross, Ga., and the Milpitas, Calif.-based Video-7 have combined technical and marketing strengths. However, each company is leasing its own EGA board. Quadram's full slot Quad EGA+ will be available primarily through retail outlets, while Video-7's VEGA, which takes up a half-slot will concentrate on the OEM marketplace. Video-7 was the first to the market with its board, released in early December.

Quadram claims "110 percent IBM compatibility," because, according to a company spokesman, the board runs more color/graphics software than the IBM EGA. Both the Quadram and Video-7 boards operate in four modes: EGA, Color/Graphics Adapter (CGA), Monochrome Graphics Adapter, and Hercules Graphics Card.

Hercules monochrome graphics compatibility is boasted as a selling point on many of the new boards. But Kevin Jenkins, president of Berkeley, Calif.-based Hercules Computer Technology, says Hercules won't be producing an EGA card, even though it now makes a CGA-compatible Hercules Color Card that is a best-seller.

Instead, Hercules hopes to create its own color standard later this year with a non-EGA-

# VEGA, Quad EGA+ Beat IBM on Versatility

## FIRST LOOK

BY CHARLES PETZOLD

The first two EGA-compatible video boards to hit the market, the VEGA from Video-7 Inc. and the Quad EGA+ from Quadram, passed their first brief test in PC Magazine Labs. Both boards successfully ran Microsoft Windows in 640 by 350 pixel 16-color mode, 1-2-3 graphics using Lotus' new EGA drivers, and two PC Magazine Labs test programs

The Video-7 VEGA (half-card) and Quad EGA+ appear to offer functional and more-versatile alternatives to IBM's adapter.



for EGA graphics.

Functionally, the two boards are the same. They use 28 chips,

compatible color card offering higher resolution.

"I don't believe cloning the EGA is the future for graphics board manufacturers," says Jenkins. "It's a poor design and doesn't deserve to be cloned."

Jenkins maintains there is a better way to achieve a higher level of graphics performance than EGA.

IBM offers a higher-resolution 640- by 480-pixel Professional Graphics Controller, but the price limits its appeal: \$2,995 list for the card, \$1,295 for the Professional Graphics Display.

Other manufacturers, such as Solon, Ohio-based Tecmar, believe the EGA makes sense.

The company missed the early wave, but Tecmar is now actively developing its own EGA contender, according to a company spokesperson.

"There is no question in my mind that the EGA resolves the problems plaguing PC users," says Tony Paradiso of AST Research in Irvine, Calif. "It is the ideal adapter. There are some drawbacks, such as price premium and the fact that software hasn't caught up with its potential."

AST has previously bundled its products with utility programs such as SideKick and DESQview. Paradiso says that the company will "investigate the possibility" of bundling its

## Reflex

(Continued from preceding page)

choices in bold characters.

*Reflex* can import and export files in the formats of the *PFS* family of programs, *dBASE II* and *III*, *1-2-3*, and *Symphony*. It can also use ASCII text files in several different forms.

*Reflex* runs efficiently on an IBM PC or compatible with two disk drives, but some disk swapping will be involved. It is much easier to run this DBMS in a hard disk system. The program requires 384K bytes of RAM and an IBM Color/Graph-

Name of File:	View	Edit	Print/File	Records	Search	Form
REFLEX.DBF						
<b>PRIMARY CONTACT RECORD</b>						
Last Name:	First:	Middle:				
Name Ext:						
Street:	City:	State: Zip:				
Phone Number:						
Birthday:						
Secretary's Name:						
Sales Rep:						
Next Recent Contact:						
Total Sales Last 12 Months:						
Comments:						
Lines: 000 Cols: 000						

*Reflex: The Analyst, Borland's \$99.95 database program, shows five views of data by using pull-down menus. The form view (above) is used to enter field names.*

ics Adapter or Enhanced Graphics Adapter or a Hercules Graphics Card for the IBM Monochrome Display. A color monitor isn't required because *Reflex* doesn't display color, but it does use screen graphics. Color can, however, be added to *Reflex* with simple screen utilities, as shown in the screen shot (at left). You can use the program in any of the PC work-alike machines that come equipped for graphics without having to invest in an RGB monitor. A mouse can be used to make menu selections, but it is not required.

# Optimem, 3M Take the Lead with Erasable Optical Storage Devices

BY CRAIG L. STARK

including four identical custom LSI chips, a 16K-byte ROM, and eight 64K-byte by 4-bit memory chips for a total of 256K bytes, the EGA maximum. The VEGA card packs smaller chips on a half-length card. Both include a monitor-select toggle switch, while IBM uses a jumper.

The boards will include software to switch them into CGA or Hercules compatibility modes, but this software was not available for PC Magazine Labs' initial test. The CGA compatibility mode apparently will allow software that does its own programming of the 6845 graphics controller chip on the CGA to successfully run on these cards. (Some do not run on IBM's EGA.) ■

AST 3-G board with software programs in the future.

Quadram's QuadEGA+ comes bundled with *Microsoft Windows*. The STB EGA Plus includes *PC Accelerator*, a utility package.

## EGA on a Motherboard

Cost-conscious manufacturers of PC compatibles may find savings by building PCs with an EGA-plus-Hercules chip set on the motherboard. While graphics standards continually evolve, officials at Video-7 believe that any PC offering monochrome, CGA, EGA, and Hercules display emulation faces little danger of obsolescence in the next few years. ■

A *Reflex* database can have 65K-byte records of 128 fields with 254 characters in each field. However, the major limitation of this program is that all of the data you want to work with must be in one file. Unfortunately, *Reflex* cannot relate between records in different files based on common fields.

## Seeing Data

The use of windows in *Reflex* lets you see data in many different ways. If you put a display of the typical columns and rows of data in the top half of the screen, you can at the same time show a

LAS VEGAS—Optical storage devices were among the most promising technologies displayed at fall COMDEX. Perhaps the most exciting technological development was a joint announcement by Optimem and 3M that may hasten the advent of real-world erasable optical storage devices.

Optimem has developed a multifunction drive that can handle all three types of 5½-inch optical media: magneto-optic erasable, write-once read-many (WORM), and optical read-only (OROM). 3M is already shipping its pre-grooved, plastic-based, erasable magneto-optic disks to Optimem, and a fully functional prototype of the drive was demonstrated at the show. It's likely, however, to be a year or two before you can buy a production model for your desktop.

Optical storage devices that permit user recording (but not erasing) are available to the consumer today, however. For large-scale needs, Optimem introduced its 1000/S, a WORM drive that stores one gigabyte of data on a 12-inch removable disk. Supplied with full PC interface and software, the 1000/S runs under DOS 3.0 or 3.1. Its \$20,000 cost may seem high—until you realize that it's only \$20 per megabyte.

sort of electronic notepad in the bottom half. The notepad holds the complete information on one data record. The displayed information in the note pad changes as you scroll the cursor through records on the top. Similarly, you can create a line chart or bar graph in one window and watch it change as you scroll through the data in the other window. The charts and graphs can be designed to create color images on a plotter or printer but not on the screen.

Even if *Reflex* cost \$495 (which it did until Corp. acquired its developer, Analytica

## ISI's WORM Drive

For somewhat smaller needs, ISI's 525 WC 5½-inch WORM drive, holding 115 formatted and certified megabytes per side, is now available in quantity from the Colorado Springs, Colo., company for \$1,598 and in single-unit "evaluation kits" for \$2,495. The package includes a single-board controller and ISIDOS, a device driver and file-management utility that is compatible with DOS 2.0 (or later) and runs on both PCs and

quarter of this year and has signed OEM agreements with Tallgrass Technologies Corp. and Lancore Technologies Inc., both of whom showed prototypes (a combination optical disk/tape backup and a LAN file server, respectively) at the 1985 fall COMDEX show in Las Vegas.

While 4.7-inch CD ROM and 5½-inch OROMS are not user-recordable, they are a natural for applications such as electronic publishing. Sony introduced its CDU-5002 CD ROM,



*Information Storage Inc.'s ISI 525 WC 5½-inch WORM drive holds 115 megabytes per disk side. It comes with single- or double-sided disks—media manufactured by Sumitomo.*

compatibles. Extra disks (media manufactured by Sumitomo) cost \$60 for single-sided and \$99 for double-sided versions.

Similarly, Optotech expects to begin shipping VAR quantities of its 400-megabyte 5984 5½-inch WORM in the first

designed to fit into a 5½-inch full-height floppy opening, at a price of \$795 each, plus an interface card for the PC (\$200) or the PC-XT (\$295). Tecmar also introduced its standalone CD Massfile reader, at a heftier \$1,695 (plus \$295 controller). ■

## PC FACT FILE

**Reflex: The Analyst**  
Bordent International  
4113 Scotts Valley Dr.  
Scotts Valley, CA 95066  
(408) 438-8400

**List Price:** \$99.95  
**Requires:** 384K RAM, two disk drives, IBM Color Graphics Adapter or Enhanced Graphics Adapter or Hercules Graphics Card.  
**In Short:** A low-cost database management program.

Contact us for other low prices on hardware and software.

Next Day Air Service. Call for latest prices.

# FREE SHIPPING

in the Continental United States

## NO SURCHARGE FOR



### 20 MEG Hard Disk System for PC™

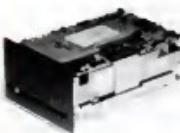


Half Height

**Internal \$469  
External \$619**

Includes Seagate Hard Disk, Western Digital Controller, Cables, Manual, Software, and Mounting Hardware.  
Boots from Hard Disk One Year Warranty \*

### 20 and 30 MEG High Speed 40 MS Hard Disks for AT™



**20 MEG \$579  
30 MEG \$699**

Includes Seagate Full Height Hard Disk, Cables, Manual, and Mounting Rails.  
Boots from Hard Disk. One Year Warranty.\*

SOLVE YOUR POWER PROBLEM.

### XT POWER 135W

**\$89**



25 or more \$75 each

Directly replaces power supply in PC™.  
Fully XT™ compatible. One Year Warranty\*

Call us for competitive prices on larger quantities of RAM chips.

**64K RAM**

**\$8**

Set of 9 chips, 200 or 150 Nanoseconds

per set

**256K RAM \$29**

Set of 9 chips

150 nanoseconds

**128K RAM for the AT™ \$19**

Set \$39

### PC's Limited Six Function Card

- Upgradable to 384K
- Clock/Calendar
- Includes Software
- Parallel Port
- Serial Port
- Game Port

Two Year Warranty \*



w/384K \$129

### PC's Limited AT Multifunction Card

- Expandable To 5 Meg (1.5 on Board/1.5 on Piggy Back Board)
- Supports 64 or 256K RAMs
- Parallel Port
- Serial Port (2nd Serial Optional)



**\$199**

w/OK

Piggy Back Board \$59 w/OK

### PC's Limited PC-576 RAM Board W/OK

- Expandable to 576K
- Supports 64K or 256K RAMS
- Fits in Short Slot

**\$69**



### PC's Limited Floppy Controller Card

**\$49**



- Supports Up To Four Drives



# VP-Planner Bests 1-2-3 On Features, Price

## FIRST LOOK

BY DAVID HOFFMAN

Adam Osborne has made good his threat to shake the foundations of high-priced microcomputer software with the introduction of *VP-Planner*. Paperback Software International, Osborne's Berkeley, Calif.-based publishing company, has released a \$99.95 1-2-3 work-alike with extra spreadsheet features, dBASE file compatibility, and a multidimensional facility that allows sophisticated data structures.

The experienced 1-2-3 user can load *VP-Planner* in a matter of minutes and throw the manual away if he or she is not interested in its extra features. *VP-Planner* uses the .WKS file format and includes macro compatibility. With very few exceptions, these files can be imported and exported freely between *VP-Planner* and 1-2-3. *Symphony* 1.1 and 1-2-3, Version 2.0, files can be retrieved by *VP-Planner* if they have been renamed with a .WKS extension.

However, formulas and macro instructions that are not applicable to 1-2-3, Version 1A, will cause errors. An up-to-date "README" file highlights potential compatibility problems.

### Cosmetic Differences

The *VP-Planner* worksheet is loaded from a start-up menu that is also used to allow access to its multidimensional counterpart. There are cosmetic differences from 1-2-3; the *VP-Planner* screen is a bit more cluttered than 1-2-3. The slash key calls the menu to the bottom of the screen rather than to the top. On-screen row and column positions are highlighted on the "frame," making it easier to determine the position of the cell pointer.

Menu items can be selected by using the function keys as

well as by pointing with the cursor or typing the initial letter of the menu choice.

Limited testing showed *VP-Planner* to be significantly slower than 1-2-3 in performing mathematical calculations. One

system time and available memory are displayed continuously on-screen.

### Four More Windows

*VP-Planner* allows six independent windows, versus two



*VP-Planner*, a 1-2-3 work-alike, imports and exports dBASE and 1-2-3 files and has up to six windows.

procedure, which included the data-fill operation and repeated copying of columns of formulas, took 70 seconds in 1-2-3, Version 1A. The same operation took 3 minutes and 10 seconds with *VP-Planner*. A recalculation that required 12 seconds for 1-2-3 to compute was done by *VP-Planner* in 35 seconds.

Paperback Software's executive vice president, Ron Ogg, admits that *VP-Planner* is slower as a result of the program's sparse matrix memory management scheme, which allows a more-efficient use of computer memory.

Time-of-day and polynomial math functions have been added. A new wait command (/XW) delays macro execution for a specified number of seconds. Expanded-range formatting options allow for time-of-day and two user-definable formats, as well as the ability to hide a range's contents. The

for 1-2-3. It supports zero (hidden) column width, to control the general appearance of the worksheet and eliminate unwanted columns during printing. Column width can be set for a range of columns, as opposed to doing it one column at a time.

*VP-Planner* includes a "learn mode" in which a series of keystrokes is "recorded" and assigned to a function key for "playback." The recorded keystrokes may also be used in a standard macro.

### Background Printing

A print menu option allows background printing so that, for example, a large worksheet can be printed while the user continues working with the program. The graph menu includes a print option that generates a full-page graphics dump to a dot-matrix printer.

Paperback Software's Ogg says the ability to save graphs in

.PIC format (as well as a utility for .DIF file conversion) will be available to users in an update. An optional printing program that includes plotter support and increased flexibility will be available for a nominal charge.

### Works with dBASE

*VP-Planner* allows for direct input and output of .DBF files from Ashton-Tate's *dBASE II* or *III*. Using selection criteria, data can be joined from several files. Data from *dBASE* can be modified in *VP-Planner*, but records may not be deleted.

The multidimensional capability of *VP-Planner* extends the simple row-and-column structure of the standard spreadsheet. A simple example is where a worksheet is used on a monthly basis. In *VP-Planner*, a third dimension of time can be used to link 12 months of data together, with a 13th month that consolidates data automatically. *VP-Planner* uses virtual memory techniques to allow up to five dimensions in a worksheet.

The manual, which is contained in a thick paperback book that also holds both program disks, does an adequate job of describing the program but does not pretend to be a comprehensive guide to 1-2-3 usage. In fact, it specifically recommends outside reading and includes a bibliography of introductory and advanced 1-2-3 reference materials.

## PC FACT FILE

**VP-Planner**  
Paperback Software International  
2612 Eighth St.  
Berkeley, CA 94710  
(415) 644-2116

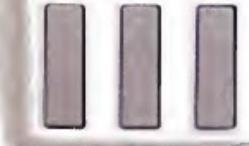
**List Price:** \$99.95, non-copy-protected version available to registered users for \$10.  
**Requires:** 256K RAM, one floppy disk drive, DOS 2.0 or later.  
**In Short:** A 1-2-3 work-alike with extra features, including dBASE file compatibility and up to six windows.

# This Little Fella Means Business.

The Mouse by Maynard Electronics makes your favorite programs faster, easier, and smarter!



At last, an "intelligent" mouse! Now you can add command power to your programs, when you want, the way you want — instantly! The Mouse by Maynard Electronics comes with our CustomKey™ software which lets you assign and reassign commands while using your favorite programs — even those without mouse utilities. Fly through programs like Symphony,™ Lotus 1-2-3,™ Framework,™ Multi-Mate,™ and others with undreamed of speed! And of course, it's fully compatible with all programs written for a mouse, too.



## Teach The Mouse To Type.

A single Mouse click will instantly produce the character, sentence, paragraph, or anything else you've selected. Click: you call up the CustomKey menu. Click: your file is saved. Click: a commonly used paragraph appears in place. No other mouse gives you such power and versatility.

## A Tale Of Three Mice . . .

Compare our Mouse with the others running around and you'll see, there's no comparison! Here are just a few features across the board:

FEATURES	Maynard Mouse	Microsoft	Mouse Systems
# of Button Combinations	Yes	No	No
Button Auto Repeat	Yes	No	No
Diagnostics	Yes	No	Yes
Dynamic Scaling	Yes	No	No
Customizable Control	Yes	No	No
Adjustable Cursor Speed-Up, On (while running application)	Yes	No	No
Adjustable Cursor Speed-Rt, Lt (while running application)	Yes	No	No
Buttons Definable (white running application)	Yes	No	No
Macros Definable (white running application)	Yes	No	No
User-Definable Alternate Cursor Movement	Yes	No	No

## Free Drawing!

Purchase The Mouse now and receive the popular paint program "Telepaint"® at no additional cost — a \$149 value!



\*Symphony and Lotus 1-2-3 are trademarks of Lotus Development Corporation. Framework is a trademark of Ashton-Tate. MultiMate is a trademark of SoftWord Systems Inc. Telepaint is a trademark of LCS/Telegraphics.



# Maynard Electronics

Shaping tomorrow's technology.

460 E. Semoran, Casselberry, FL 32707 • 305/331-6402

Available at the finest computer stores. Contact your local dealer or write to us today for product information.

CIRCLE 476 ON READER SERVICE CARD

# "...Sherman tank of hard disk drives."



InfoWorld  
July 22, 1985

## HAVE A NICE INQUISITION, DEAR.

When InfoWorld's contributing editor Bernie Zilbergeld and the InfoWorld Review Board said they reviewed our ATplus20™ hard disk drive, we figured that they gave it the routine technical and performance diagnostics.

We didn't expect destructive testing. They went after our legendary resistance to head-crashes with a vengeance.

## HOW TO HENCH.

Mr. Z and his henchpersons began by subjecting the drive to 3,500 stops and starts.

Having survived this, our ATplus20™ drive then had to face increasingly severe physical torture while performing a seemingly relentless series of track seeking operations.

## THINGS THAT GO BUMP IN THE DAY.

Further henching resulted in their bumping the table that the ATplus20™ was running on.

Then they dropped one side of the table from a height of six inches.

Next, the entire table was lifted one foot above the floor and dropped.

After cutting power to the drive (thus interrupting the seek test) they bumped the table severely, to see if the ATplus20's unconditional and automatic park and lock feature really makes a difference.

Then, they threw the book at us. Actually, they dropped a rather heavy book directly on top of the drive itself.

## GUESS WHAT?

You're absolutely right. CORE's ATplus20™ hard disk drive not only survived, but continued to perform as specified.

Each of the rather unnerving tests was repeated a number of times on the same drive, just to be extra sure.

Or mean.

## THE LAWYER'S 24.

The tests were so nasty that they had to publish the following warning:

*"We caution you not to perform any of these tests on your own equipment."*

We have to agree.

These tests were done to determine the limits of the drive, and were intentionally extreme beyond the normal use environment.

## SEAL OF APPROVAL.

We're delighted that InfoWorld tested, evaluated and validated exactly what we have been saying all along: *Now you can build the enhanced PC-AT that IBM didn't.*

## DOS, XENIX & MORE.

Along with the highest reliability among PC-AT compatible drives, we offer full compatibility with PC-DOS 3.0 and higher.

And XENIX™ compatibility with CORE's ATplus™ XENIX update.

A significant number of ATplus drives are running under the IBM, NOVELL and other networks.

Those users are delighted with our speed and performance.

## PEACE OF MIND.

ATplus™ drives come with a full one-year warranty, supported by CORE and other major maintenance service companies.

Thus, we offer you a choice of on-site, local, or exchange maintenance services.

Known as CORE's Sudden Support™, all services are extendable to your entire AT system, and after the warranty runs out.

## WE'LL BE AROUND.

We're the world's largest supplier of high-performance PC-AT compatible hard disk drives.

Now, respected magazines such as InfoWorld and PC Magazine have told you how we got there.

Please contact us directly for full and unedited reprints of this and other prominent computer magazine reviews.

**CORE**  
INTERNATIONAL

7171 North Federal Highway Boca Raton, Florida 33431 305/997-6055  
Telex: 315 809 CORE INT'L DEBE

CIRCLE 225 ON READER SERVICE CARD

IBM is a registered trademark of International Business Machines Corporation.

NOVELL is a trademark of NOVELL, INC.

XENIX is a trademark of Microsoft Inc.

# THE PC'S LIMITED AT™—\$1995. THE PC'S LIMITED TURBO PC™—\$795.



At these prices, it's no wonder  
we're burning up the marketplace.

Yes, you can believe it. Since we ran our first advertisement for the PC's Limited AT™ and Turbo PC™, the calls we've received mostly start with comments like "Is this for real?" And "How can that be?" But now that our machines are in the hands of influential buyers, the questions tend to concern quantity discounts for further purchases. (Which are available.) You see, the PC's Limited machines are assembled from components bought worldwide with our strong buying power. Then they are offered directly to you—with no middleman markups. So light a match to your old budgets. With the savings we're providing, you'll have money to burn.

#### PC'S LIMITED AT™

- 80286-based System Unit (runs at 6MHz, 8MHz optional)
- 1024K on Mother Board
- 1.2 Meg Floppy Drive
- Combined Floppy/Hard Disk Controller Card
- AT Keyboard
- 192W Power Supply
- 2 Serial and 1 Parallel Port
- Clock/Calendar with Battery Backup

Runs all Major Software written for the IBM PC™, PC XT™, and PC AT™. Unit has 8 Expansion Slots, with 7 available in above configuration. Same Bus Configuration as IBM PC AT™.

#### PC'S LIMITED TURBO PC™

- 16-bit 8088-2 System Unit (running at 4.77 or 6.66MHz)
- 640K on Mother Board
- 360K Floppy Drive
- Keyboard
- 135W Power Supply

Runs all Major Software written for the IBM PC™ and PC XT™, 40% faster, without modifications. Unit has 8 Expansion Slots, with 7 available in above configuration.

IBM™ is a registered trademark of International Business Machines Corporation.  
IBM PC, PC XT, and PC AT are trademarks of International Business Machines Corporation.



## PC'S LIMITED™

SALES-RELATED CALLS OUTSIDE TEXAS, 1-800-426-5150  
1611 Headway Circle, Building 3, Austin, Texas 78754

Sales Calls from anywhere in country, (512) 339-6962

Technical Support Calls, (512) 339-6963 Customer Service Calls, (512) 339-6964  
Telex No. 9103808386 PC LTD

Ad number 2114

CIRCLE 180 ON READER SERVICE CARD

# NO OTHER HARD DISK BACKS YOU UP LIKE SYSGEN. **HARD DISK AND AUTOMATIC TAPE BACK-UP: \$1395.**



10 Mbyte disk/20 Mbyte cassette tape with automatic tape back-up and error correction for \$1395.

#### Why the Sysgen Flat-Pak™ is your *smartest* storage and back-up choice:

The Flat-Pak, like all Sysgen systems, is designed so you can sit down at your PC and use it. Period. A reliable Sysgen hard disk keeps your data on-line. You never have to juggle disks or cartridges. And only Sysgen backs your data up automatically. All in a slim half-height chassis that slips neatly under your monitor. So absolutely nothing stands between you—and your work.

**Only Sysgen gives you *unattended* back-up.** Set the Flat-Pak once, like a VCR, and it will back up your data up twice daily, seven days a week. *That's smart.*

#### Two ways to get unbeatably affordable disk and tape add-on:

Choose the 10 Mbyte Flat-Pak with 20 Mbyte cassette back-up; or the 20 Mbyte version with 60 Mbyte



20 Mbyte disk/60 Mbyte cartridge tape with QIC-24 industry standard tape format, automatic tape back-up and error correction for \$2095.

cartridge back-up, using the industry standard QIC-24 tape data format.

Because both Flat-Pak systems utilize your IBM's hard disk controller, they are compatible with all software written for current versions of PC DOS®. (Should your system require it, Sysgen offers an XT compatible controller for just \$350.)

#### Get the *smartest, most reliable storage and back-up solution—at the best price.*

Sysgen's entire disk and smart tape family offers an unbeatable combination of capacity and value. You won't find a smarter solution—or a better price.

Compare for yourself. For a Sysgen dealer near you, call 1-800-821-2151, Dept. 28



**SYSGEN**  
INCORPORATED

Trademarks: Sysgen, Flat-Pak, Sysgen Inc. Registered Trademarks: IBM, PC DOS—International Business Machines Corporation

47853 Warm Springs Blvd., Fremont, CA 94539  
(415) 490-6770, Telex 4990843

## NEWS IN BRIEF EDITED BY JANE MINTZER

**Kodak Expands Data Storage . . .** In an effort to provide an alternative to hard disk drives and low-storage floppy drives, Eastman Kodak Co. has announced three high-density disk drives.

The 12-megabyte drive, developed with Data Technology Corp. of Santa Clara, Calif., is a 5½-inch half-height removable cartridge drive with 10 megabytes of formatted storage capacity. It features a built-in controller with an embedded small-computer system interface, which allows the drive to communicate with mainframes and personal computers. The 10-megabyte drive utilizes a variable rate recording process that assigns a faster recording rate for the outer tracks and a slower rate for the inner tracks.

The advanced 6.6-megabyte drive is a 5½-inch half-height floppy drive with a formatted storage capacity of 5.24 megabytes. The 3.3-megabyte floppy drive has a storage capacity of 2.78 megabytes. Both floppy drives have a fast (3-millisecond) track-to-track access time, a 500-kilobit-per-second transfer rate, and downward-read capabilities, which enable the drives to read data from lower-density drive/media combinations as found on the IBM PC and AT.

Eastman Kodak Co. is located at 343 State St., Rochester, NY 14650; (716) 724-4241.

**DEST Low-Cost Page Scanner . . .** DEST Corp. of Milpitas, Calif., announced PC Scan, a compact page scanner that automatically reads information from paper into PCs, and *Text Pac*, a character-recognition program for PC Scan that can transfer

text from the scanner directly into one of several word processing programs.

PC Scan has a character-recognition processor and an image-capturing capability that scans 300 dots per inch (or 20 seconds per page) and communicates to the PC through an industry-standard small-computer system interface. With *Text Pac*, PC Scan can enter text from the scanner into word processing programs such as *MultiMate* and *WordStar* in the ex-



At a list price of \$1,995, PC Scan reads a page of text from paper to a personal computer at a rate of 20 seconds per page. PC Scan can be used with *Text Pac*, a character recognition program that transfers text to word processors.

act format of each word processor. *Text Pac* can also recognize all common business documents. During a demonstration of the text scanner at the PC Magazine offices, PC Scan was able to scan random press releases with a minimal number of recognition errors.

PC Scan and *Text Pac* sell for \$1,995 and \$595, respectively. DEST Corp. is located at 1201 Cadillac Court, Milpitas, CA 95035; (408) 946-7100.

—Virginia Dudek

### Tape Backup with Mini Data Cartridges . . .

Irwin Magnetics has become the first manufacturer to begin production of 40-megabyte tape backup systems using the new ½-inch 3M DC 2000 mini data cartridges. Two new drives, a half-height, 20-track, 5½-inch internal unit (Model 145), and a full-height standalone model (Model 345) use the PC's own floppy disk controller and are supplied with Irwin's *Level 0* software. Both drives can also read and write data using the Irwin-formatted DC 1000 cartridges, which use a 0.15-inch tape.

The DC 2000 cartridge is expected to become the mainstay of smaller tape backup systems, with large requirements being handled by the recently announced ½-inch 3480 IBM data cartridges.

The Irwin format uses a Reed Solomon error correction code instead of the 3M-recommended error correction system for the DC 2000, which requires less overhead (11 percent versus 50 percent) and no verification pass.

Irwin says the Model 145, which uses the PC's power supply, will cost well under \$1,000 and begin shipping by spring 1986.

—Craig L. Stark

**AI for the Masses . . .** The cost of an artificial intelligence application language has dropped to an affordable level courtesy of a company named Chalcedony Enterprises, whose \$99.95 *Prolog V-Plus* claims to be the first Prolog interpreter powerful enough for real-world applications at a real-world price. The program is able to use up to 640K of RAM, and its coresidency feature allows users to call up other programs to the screen while *Prolog V-Plus* is in use.

For more information, contact Chalcedony Enterprises at 5580 La Jolla Blvd., La Jolla, CA 92037; (619) 483-8513.

**Gem of a Utility . . .** Emerald Systems Corp. has made it possible for hard disks to be merged, saving small-capacity disks from the junk pile. *DiskMeld*, a software utility included with its line of high-capacity storage subsystems, combines separate drives into one logical volume. This allows PC users to add their existing disk capacity to that of the Emerald unit. Emerald vice president of engineering Peter Shultz says that the utility shatters the 32-megabyte DOS barrier, allowing for the creation of files as large as the combined disk size.

*DiskMeld* is available only with an Emerald disk system and there are no plans to market it as a separate product. Emerald's internal subsystems range in price from \$2,350 to \$16,310. For those wishing to learn more about *DiskMeld* and other Emerald products, the company is located at 4757 Morena Blvd., San Diego, CA 92117; (619) 270-1994.

—Charles Bermont

**Epson Replaces FX-185 . . .** Epson America Inc. of Torrance, Calif., replaced its FX-185 dot matrix printer, just a half year after its introduction, with the new FX-286. The new FX-286 prints 200 characters per second in draft mode (40 cps faster than the FX-185) and 40 cps in near-letter-quality mode. The FX emulates both the Epson and the IBM Prinwriter codes.

Epson says that the new printer announcement did not result from a shortage of FX-185s, but rather from an increase in demand for a faster printer with improved features. Epson will fill back orders for the FX-185 with the FX-286. The FX-286 has a list price of \$749, \$50 more than the FX-185. The normal-carriage FX-85 model continues unchanged.



The new Epson FX-286 printer prints 40 cps faster in draft mode (200 cps) than the FX-185 it is replacing. This \$749 printer emulates both the Epson and the IBM Prinwriter codes.

**Floppy Drives from Tandon . . .** Tandon Corp. has now introduced two new members of its Thinline series of half-height floppy drives for the IBM PC AT and compatibles. The TM75-2 has 360KB bytes of recording capacity and will cost less than \$80 in OEM quantities. The TM75-8 has an OEM price of under \$100 and offers 1.2-megabyte capacity.

Both drives are available now. For more information, contact Tandon Corp. at 20320 Prairie St., Chatsworth, CA 91311; (818) 993-6644.



# The right prices. The right products. The right choice.

P35

## IBM HARDWARE

AST	Line Out
StarPak Plus 54K	\$395 \$239
StarPak Plus 384K, 5/P/C	\$995 \$689
Additional memory for AT:	\$395 \$449
CENTRAL POINT	
PC Option Board	\$ 95 \$ 91
COMS	
130 Watt Power Supply	\$179 \$ 85
EVEREX	
The Color/Mono Board	\$399 \$269
HAUPTPAGE (HWC)	
ROST Chip	\$175 \$129
80287 Fast-5 Chip	\$295 \$199
HERCULES	
Color Card with Parallel Port	\$415 \$169
Mono Graphics Card	\$499 \$219
IMSI	
PC Mouse with Paintbrush	\$220 \$129
INTER	
Above Board 84K for PC	\$395 \$299
Above Board 128K for AT	\$395 \$299
KENSINGTON	
Masterpiece Plus	\$180 \$129
KEYTRONIK Keyboards	
KBS151 or KBS151 Jr.	\$255 \$169
MICROSOFT	
Mouse	\$195 \$138
MOUSE SYSTEMS	
PC Mouse with Paint	\$220 \$145
Mouse with Software (M)	\$220 \$138
PEPSY	
PC Mem. Board w/Far Port	\$250 \$159
Color Board	\$210 \$139
QUADRAM	
Quadboard 128 RAM to 384K	\$295 \$195
Quadboard 384K S/P/C/Q	\$795 \$229
Quadcolor 4 Board 4 colors	\$225 \$175
RACORE	
Expansion Chassis (Jr)	\$675 \$389
120K Expansion Board (Jr)	\$275 \$152
TELA	
JRAM II board	\$219 \$159
JRAM III 256K Board	\$399 \$269
TECMAR	
Jr. Captain	\$395 \$309
TITAN	
PC Accelerator 128K	\$795 \$599
VIDEO 7	
Mono Graphics Card	\$250 \$179
MGC with Parallel Port	\$300 \$215
VEGA Board IBM EGA Comp	\$399 \$249

## DISKETTES

CONROY-LAPOINTE DISKETTES	
10 in 55/SD 35 trs (Apple)	\$ 13
10/100 in 55/SD 35 trs	\$ 99 \$689
10 in 35/SD 3.5" (Mac)	\$ 25
50/SD 35 trs	\$110 \$735
10 in 25/HD 40 trs (IBM)	\$100 \$700
10/100 in DS/DD 40 trs	\$110 \$700
10/100 in DS/DD 96 TPI (IBM-AT)	\$ 29
10/100 in DS/DD 96 TPI (IBM-AT)	\$269
GENERIC	
10/100 in SS/DD 35 TRK (Apple)	\$ 9 / \$ 75
10/100 in DS/DD 40 trs (IBM)	\$100 \$700
10/100 in DS/DD 96 TPI (IBM-AT)	\$ 27 / \$49

## MODEMS

HAYES	
1000/1000 Comm. Buffer	\$729 \$599
Smartmodem 1200B (Mod. Int.)	\$549 \$579
Smartmodem 1200 (External)	\$499 \$449
2400 Modem (External)	\$899 \$619
PERIPHERALS	
ProModem 1200B (Internal)	\$390 \$299
VENTEL	
PC Halfcard (IBM Internal)	\$549 \$389

CONROY-LAPOINTE COMPUTER STORES 3 Locations. Retail Sales Only. Store Prices May Vary.  
 San Francisco, CA - 415-982-6212 • Across from The Pyramid On Washington St. Near Montgomery  
 Portland, OR - 503-620-5395 • Business Park 217, Tigard, At Intersection of Hwy's 217 & 99W  
 Seattle, WA - 206-455-0206 • Belgate Plaza In Bellevue, 2 Blocks North Of Bellevue Square

1•800•547•1289

Customer Service (503) 620-9877 Hours 8-5 (Pacific) Mon-Fri, 8-5 Sat. Foreign, Local (303) 620-9878 Telex 910 380 3980

## IBM SOFTWARE

ASHTON-TATE	Line Out
Framework II	\$695 \$415
diskII 386	\$695 \$395
dBase III (PC DOS & 128K)	\$495 \$305
CENTRAL POINT	
PC Option Board	\$ 95 \$ 91
COMS	
130 Watt Power Supply	\$179 \$ 85
EVEREX	
The Color/Mono Board	\$399 \$269
HAUPTPAGE (HWC)	
ROST Chip	\$175 \$129
80287 Fast-5 Chip	\$295 \$199
HERCULES	
Color Card with Parallel Port	\$415 \$169
Mono Graphics Card	\$499 \$219
IMSI	
PC Mouse with Paintbrush	\$220 \$129
INTER	
Above Board 84K for PC	\$395 \$299
Above Board 128K for AT	\$395 \$299
KENSINGTON	
Masterpiece Plus	\$180 \$129
KEYTRONIK Keyboards	
KBS151 or KBS151 Jr.	\$255 \$169
MICROSOFT	
Mouse	\$195 \$138
MOUSE SYSTEMS	
PC Mouse with Paint	\$220 \$145
Mouse with Software (M)	\$220 \$138
PEPSY	
PC Mem. Board w/Far Port	\$250 \$159
Color Board	\$210 \$139
QUADRAM	
Quadboard 128 RAM to 384K	\$295 \$195
Quadboard 384K S/P/C/Q	\$795 \$229
Quadcolor 4 Board 4 colors	\$225 \$175
RACORE	
Expansion Chassis (Jr)	\$675 \$389
120K Expansion Board (Jr)	\$275 \$152
TELA	
JRAM II board	\$219 \$159
JRAM III 256K Board	\$399 \$269
TECMAR	
Jr. Captain	\$395 \$309
TITAN	
PC Accelerator 128K	\$795 \$599
VIDEO 7	
Mono Graphics Card	\$250 \$179
MGC with Parallel Port	\$300 \$215
VEGA Board IBM EGA Comp	\$399 \$249

## DIGITAL RESEARCH

U/M FDD	\$ 65
Gen. Drvr	\$ 70 \$ 40
DOW JONES	
Spreadsheet Link or Market Mgr	\$249 \$159
Market Analyzer	\$349 \$249
FUNK SOFTWARE	
Sideways New VERSION	\$ 50 \$ 42
XT/POWERED	
Tool Project Manager	\$495 \$295
HOWARD SOFT	
1986 Tax Preparer	\$395 \$199
HUMAN EDGE	
Micro Probe	\$ 50 \$ 39
INFOCOM	
Intercom	\$495 \$300
LIFETREE	
Volkswriter Deluxe	\$295 \$159
VIEW-MOVIE	
Think Tank	\$195 \$100
LOTUS	
1-3 NEW VERSION	\$495 \$329
Symphony	\$495 \$449
Symphony Report Writer	\$150 \$125
MAGNUM COMPUTER	
Fastrax, RAMdisk & Print Spooler	\$ 50 / \$ 39
MICROPRO	
R/Rane 5000	\$195 \$885
Executive Report Writer	\$195 \$885
R/Rane 6000	\$249 \$1133
MICROSOFT	
QuickBasic	\$ 99 \$ 69
Windows	\$ 95 \$ 69
Macro Assembler	\$150 \$ 96
Assembler	\$150 \$ 96
Word	\$375 \$239
MICROSTUFF	
Crashfix XVI	\$190 \$110
MULTIMATE	
Mathematician	\$495 \$229
Advantage requires 128K	\$395 \$226
PETER NORTON	
Norton Utilities	\$100 \$ 56
POLYTRON	
PolyWindows	\$ 65 \$ 45
ROSENSTEIN	
Project	\$130 \$ 90
SATELLITE (SS)	
WordPerfect NEW VERSION	\$495 \$229
SOFTWARE PUBLISHING	
PS: Write, File or Graph	\$100 \$ 64

## SYNTHESYS

## SYNTHESYS

100% IBM PC/XT Compatible	
Dual Speed 4.77 and 5 MHz 30882	
RAM Expander to 640K On Motherboard	
380K RAM Disk Drives	
380K RAM Disk Controller	
380K RAM Disk Controller Board	
380K RAM Disk Controller Board-It	
3 Expansion Slots	
8087 RAM Disk Controller Built-In	
8087 RAM Disk Controller Interface Built-In	
MD-DOS Operating System	
Commodore User Operating Manual	
IBM PC/XT Compatible	
IBM PC/XT Compatible Processor	
8087-2 Co-Processor (optional)	
RAMDisk & Printer Spooler	
RAMDisk & Printer Spooler	
Fast 10 Day Limited Warranty	

## SYSTEMS

## SYSTEMS

B-540K 236K	\$ 995
Floppy Drives	
C-640K 1 floppy	\$1595
10 MB Hard Drive	
D-Sync C plus	\$2295
J-640E 1 floppy, 20 MB Hard Drive	\$1795

Other systems available, please call.  
 Above prices exclude video card and monitor

## Internal Hard Drives

## 10 meg

with controller

## 20 meg

with controller

90 day limited warranty



## CHIP KITS

## 64K \$ 8

1-99 sets \$10

100+ sets

## 256K \$32

1-99 sets \$12

100+ sets

## 128K \$37

1-99 sets \$19

100+ sets

## COMX/IRWIN Tape Backup System

## 10 meg

Line Out \$495

90 day limited warranty

## CDC 360K Floppy Drives

## Half Ht. \$ 75

Full Ht. \$119

90 day limited warranty



## MAGNUM EconoRAM

## 384 KB

Line Out \$89

For IBM PC, XT and compatibles with 386 processor

1 Year Limited Warranty

## PC MasterCard

## 384 KB

Line Out \$179

1.5 MB

Line Out \$329

For 386, 486, 586, 786, 8087, 8088, 8089, 8089+, 8089+2, 8089+3, 8089+4, 8089+5, 8089+6, 8089+7, 8089+8, 8089+9, 8089+10, 8089+11, 8089+12, 8089+13, 8089+14, 8089+15, 8089+16, 8089+17, 8089+18, 8089+19, 8089+20, 8089+21, 8089+22, 8089+23, 8089+24, 8089+25, 8089+26, 8089+27, 8089+28, 8089+29, 8089+30, 8089+31, 8089+32, 8089+33, 8089+34, 8089+35, 8089+36, 8089+37, 8089+38, 8089+39, 8089+40, 8089+41, 8089+42, 8089+43, 8089+44, 8089+45, 8089+46, 8089+47, 8089+48, 8089+49, 8089+50, 8089+51, 8089+52, 8089+53, 8089+54, 8089+55, 8089+56, 8089+57, 8089+58, 8089+59, 8089+60, 8089+61, 8089+62, 8089+63, 8089+64, 8089+65, 8089+66, 8089+67, 8089+68, 8089+69, 8089+70, 8089+71, 8089+72, 8089+73, 8089+74, 8089+75, 8089+76, 8089+77, 8089+78, 8089+79, 8089+80, 8089+81, 8089+82, 8089+83, 8089+84, 8089+85, 8089+86, 8089+87, 8089+88, 8089+89, 8089+90, 8089+91, 8089+92, 8089+93, 8089+94, 8089+95, 8089+96, 8089+97, 8089+98, 8089+99, 8089+100, 8089+101, 8089+102, 8089+103, 8089+104, 8089+105, 8089+106, 8089+107, 8089+108, 8089+109, 8089+110, 8089+111, 8089+112, 8089+113, 8089+114, 8089+115, 8089+116, 8089+117, 8089+118, 8089+119, 8089+120, 8089+121, 8089+122, 8089+123, 8089+124, 8089+125, 8089+126, 8089+127, 8089+128, 8089+129, 8089+130, 8089+131, 8089+132, 8089+133, 8089+134, 8089+135, 8089+136, 8089+137, 8089+138, 8089+139, 8089+140, 8089+141, 8089+142, 8089+143, 8089+144, 8089+145, 8089+146, 8089+147, 8089+148, 8089+149, 8089+150, 8089+151, 8089+152, 8089+153, 8089+154, 8089+155, 8089+156, 8089+157, 8089+158, 8089+159, 8089+160, 8089+161, 8089+162, 8089+163, 8089+164, 8089+165, 8089+166, 8089+167, 8089+168, 8089+169, 8089+170, 8089+171, 8089+172, 8089+173, 8089+174, 8089+175, 8089+176, 8089+177, 8089+178, 8089+179, 8089+180, 8089+181, 8089+182, 8089+183, 8089+184, 8089+185, 8089+186, 8089+187, 8089+188, 8089+189, 8089+190, 8089+191, 8089+192, 8089+193, 8089+194, 8089+195, 8089+196, 8089+197, 8089+198, 8089+199, 8089+200, 8089+201, 8089+202, 8089+203, 8089+204, 8089+205, 8089+206, 8089+207, 8089+208, 8089+209, 8089+210, 8089+211, 8089+212, 8089+213, 8089+214, 8089+215, 8089+216, 8089+217, 8089+218, 8089+219, 8089+220, 8089+221, 8089+222, 8089+223, 8089+224, 8089+225, 8089+226, 8089+227, 8089+228, 8089+229, 8089+230, 8089+231, 8089+232, 8089+233, 8089+234, 8089+235, 8089+236, 8089+237, 8089+238, 8089+239, 8089+240, 8089+241, 8089+242, 8089+243, 8089+244, 8089+245, 8089+246, 8089+247, 8089+248, 8089+249, 8089+250, 8089+251, 8089+252, 8089+253, 8089+254, 8089+255, 8089+256, 8089+257, 8089+258, 8089+259, 8089+260, 8089+261, 8089+262, 8089+263, 8089+264, 8089+265, 8089+266, 8089+267, 8089+268, 8089+269, 8089+270, 8089+271, 8089+272, 8089+273, 8089+274, 8089+275, 8089+276, 8089+277, 8089+278, 8089+279, 8089+280, 8089+281, 8089+282, 8089+283, 8089+284, 8089+285, 8089+286, 8089+287, 8089+288, 8089+289, 8089+290, 8089+291, 8089+292, 8089+293, 8089+294, 8089+295, 8089+296, 8089+297, 8089+298, 8089+299, 8089+300, 8089+301, 8089+302, 8089+303, 8089+304, 8089+305, 8089+306, 8089+307, 8089+308, 8089+309, 8089+310, 8089+311, 8089+312, 8089+313, 8089+314, 8089+315, 8089+316, 8089+317, 8089+318, 8089+319, 8089+320, 8089+321, 8089+322, 8089+323, 8089+324, 8089+325, 8089+326, 8089+327, 8089+328, 8089+329, 8089+330, 8089+331, 8089+332, 8089+333, 8089+334, 8089+335, 8089+336, 8089+337, 8089+338, 8089+339, 8089+340, 8089+341, 8089+342, 8089+343, 8089+344, 8089+345, 8089+346, 8089+347, 8089+348, 8089+349, 8089+350, 8089+351, 8089+352, 8089+353, 8089+354, 8089+355, 8089+356, 8089+357, 8089+358, 8089+359, 8089+360, 8089+361, 8089+362, 8089+363, 8089+364, 8089+365, 8089+366, 8089+367, 8089+368, 8089+369, 8089+370, 8089+371, 8089+372, 8089+373, 8089+374, 8089+375, 8089+376, 8089+377, 8089+378, 8089+379, 8089+380,

## PC UPDATE BY VIRGINIA DUDEK

**NEW YORK** - Multimate International of East Hartford, Conn., has announced Version 3.6 of the MultiMates Advantage Professional Word Processor. New features include support for up to eight columns per page. Users can now set the width and tabs for each column, as well as the spacing between columns. Version 3.6 also supports winding text and logically associated columns, which allows related text to run side by side. All editing functions are supported in the column mode, and text will be reformatted automatically. Also added are a 40,000-word thesaurus, a typewriter mode for creating and printing text character by character, and search capability for footnote symbols, double under-scoring, and section numbers. Upgrades are \$60. Those who bought Version 3.5 after December 1, 1985, can receive a free upgrade.

\*\*\*

Microsoft Corp. of Bellevue, Wash., announced Version 4.0 of Microsoft Macro Assembler. This new version is written in C, and Microsoft claims that it's three times faster than the old version. Users can now assemble larger source files, with more symbols and macro text. New assembly switches have been added, as has screen swapping, which permits switching between the debugging screen and the application output. Version 4.0 has complete upward compatibility with earlier Microsoft and IBM Macro Assemblers. Registered users of the previous Microsoft, IBM, Texas Instruments, or Zenith versions can upgrade for \$75.

\*\*\*

Digital Communications Associates of Alpharetta, Ga., announced that its IRMA micro-to-mainframe interface board will now be bundled with two file transfer software programs that are faster than the software previously included. IRMALink FT/TSO and FT/CMS permit rapid transfer of files between IBM mainframes and microcomputers in a 3270 communications network. Both programs also contain the PC segment of the fast file

\*\*\*

transfer software program as well as the host section. Previously, IRMA only included software that contained the host section. The bundled IRMA board is still \$1,195. Users who have received IRMA between August 1, 1985 and November 15, 1985 can request a free copy of the PC portion of FT/TSO and FT/CMS from DCA. The two file transfer programs can also be purchased separately for \$115 each.

\*\*\*

**Short Takes:** Toshiba America Inc. of Tustin, Calif., announced that dual emulation of Qume Sprint 11 daisy wheel printers and the IBM Graphics Printer is now standard on the 24-pin Toshiba P351 3-in-One dot matrix printer. The Toshiba P351 now uses the full IBM Extended Character Set, with block graphics characters, and performs full graphics screen dumps from PCs ... Fox and Geller of Elwood Park, N.J., announced dUTIL-III Plus, a new version of its dBASE programmer's toolbox. dUTIL-III Plus works with dBASE III and dBASE III Plus. New features include the ability to produce complete cross-references listings of dBASE programs, support for PROCEDURES files, and an "include" feature that lets you store commonly used code in one place for simplified program maintenance. dUTIL-III Plus retails for \$149. Upgrades are \$39 ... Alpha Software Corp. of Burlington, Mass., announced Version 1.1 of Electric Desk, an integrated spreadsheet, word processor, database manager, and communications program. Version 1.1 has a DOS access service that lets users perform DOS functions without exiting from Electric Desk. Also added are global search and replace and expanded index commands for multi-level sorting. Upgrades are \$59.

*PC Update reports on software and hardware enhancements. To contribute, write or call Virginia Dudek, PC Magazine, One Park Avenue, New York, NY 10016. (212) 503-5265.*

## Demo Programs Simulate Software, Aid Teaching

BY CHRISTOPHER  
JOHNSTON

Demonstrating how to use particular programs or even simulating programs not yet in existence is now a snap, thanks to two recently released products.

*Dan Bricklin's Demo Program*, \$74.95 from Software Garden (P.O. Box 238; West Newton, MA 02165; (617) 322-2240), is designed primarily to be a software developer's tool. The program simulates a working program by creating dummy

screens, simulating disk access, and allowing keyboard entry. One possible use, says Bricklin, codveloper of *VisiCalc*, is that it enables programmers to give venture capitalists a feel for what a program will look like once it's written.

### AutoMentor Tutorials

For the considerably more expensive AutoMentor (\$895), from Software Recording Corp. (600 Fifth Ave.; San Rafael, CA 94901; (415) 258-0800), creating demos of not-yet-written

programs is only one of its functions. AutoMentor can record keystrokes of other programs, then play them back later with inserted messages for other users.

For instance, a central office could create and record the keystrokes for a 1-2-3 template, which would be distributed to branch offices. Upon playback, the worksheet would be created, and messages would appear on-screen, such as "insert fourth-quarter results here" with an arrow pointing to the appropriate cells. An optional speech board (\$950) digitizes spoken messages that can later be replayed in the program.

With AutoMentor, software

companies can rapidly create tutorials overlaid on an actual program. Software Recording is also targeting AutoMentor toward large corporations that would like to automate training sessions.

Both programs include the choice of keystroke as well as screen recording and editing, highlights for important notation, boxes for commenting, and the utilization of all 256 PC screen characters. Screens can be timed to produce a PC slide show.

AutoMentor also offers painting commands and menus.

AutoMentor demo disks are \$10, and a run-time version is available for \$2,500. ■



Fontasy printed all of these

## See What You Can Do With

**P**resentations! Newsletters! Flyers! Signs! Overhead Foils! Invitations! Menus! Logos! Announcements! Banners! Layouts! When you need a good-looking visual quickly you need FONTASY — superb typefaces and simple drawing in one easy-to-use package.

FONTASY gives you a "what-you-see-is-what-you-get" picture, as you type and draw on the graphics screen of your IBM PC. You can create a page at a time, see a mini-picture of that page, print it, and save it on disk. Page size is limited only by memory, not by screen size.

### Features

Proportional space, justify, kern, bold face, rearrange, magnify, black/white reversal, rotate, mirror image, lines, rectangles, ovals, draw, fill-in, undo (and unundo), on-line help, 200-page book, and easy control from keyboard or mouse. Corporate license available.

Fonts, fonts, and more fonts! We have over 275 typefaces in our growing library, and will be happy to send you free print samples on request.

When you deal directly with the manufacturer (that's us), you pay rock-bottom distributor prices. If you order FONTASY now, we will give you 28 fonts (a \$50 value) at no extra charge. With so many features at such a low price, FONTASY belongs in your software library even if you already have a "font" program.

# FONTASY®

# \$49.95

Introductory  
Price until April 30, 1986

### Equipment Needed

iBM-PC, XT, AT, or true compatible (Compaq, etc.) with iBM or Hercules graphics adapter and graphics monitor. 256K memory needed for partial pages, 448-640K recommended for full pages. Dot matrix printer. Mouse optional. MS-DOS 2.0 or above.

FONTASY supports iBM graphics printer, Printer: Epson FX, JX, LX, MX, RX, and LQ-1500, C. Itoh 8510, 1550, 1570, Writer-Jr, H-P LaserJet, Threket, Microline 92, 93, Gemini 10X, 15X; Radio Shack DMP 105, 490, 2100; Toshiba 551, 1340-1351; Star, and most Epson-compatibles.

### Money-Back Guarantee

Fontasy is not copy-protected and has a 30 day money back guarantee. So, take advantage of our breakthrough price and order now TOLL FREE:

**1-800-824-7888, operator 577 (ORDERS ONLY)**

For further information and same day shipping, call: (818) 765-4444

**PROSOFT®**

248 Bellaire Ave., Box 560  
No. Hollywood, CA 91603-0560

Name \_\_\_\_\_ Company \_\_\_\_\_  
Address \_\_\_\_\_ Telephone \_\_\_\_\_  
City, State, ZIP \_\_\_\_\_ Exp. Date \_\_\_\_\_  
Visa/MC \_\_\_\_\_ Memory \_\_\_\_\_ Printer \_\_\_\_\_  
Computer \_\_\_\_\_

Terms: M/C, Visa, checks. Please add \$3.00 shipping and handling in U.S. or  
Canada. \$20.00 overseas. \$2.00 for C.O.D. and sales tax in Calif.

**FONTASY \$49.95**

Tax  
Shipping  
Total

# Meet our P

## Choosing a modem for your personal computer just got easier.

Modems are remarkable little gadgets. They can connect you and your PC to mountains of data and oceans of information. But up until now, deciding which modem to buy hasn't been easy. So to solve that little problem, IBM is offering two 1,200 bps PC modems. Modems that not only give you the best features currently available on PC modems, but also offer features usually found only on higher priced, higher speed modems.

### First, a Brief Introduction to the IBM PC Modems:

The IBM 5841 is a stand-alone modem capable of operating at 0-300, 600 and 1,200 bps in asynchronous mode, and 600 and 1,200 bps synchronous.

Our other modem is the IBM Personal Computer Modem—an internal, half-card modem that operates at 0-300, 600 and 1,200 bps asynchronous.

### The Non-Identical Twins

In some respects, these two modems are very similar. For example, they both have Automatic Adaptive Equalization—which means they will continuously fine-tune themselves to compensate for changes and noises on the telephone line. The result is, you can receive data over a wider range of phone line conditions. This is one of those features more often found on faster, more expensive modems.

In addition to automatic answering, both modems offer Adaptive Dialing—which means that if you don't specify either tone or pulse dialing, the modems try tone dialing for one digit, and if that doesn't work,

they automatically switch to pulse dialing.

Both modems will automatically re-dial a number as many times as you tell them to. Or if you prefer, they can switch to an alternate number on a busy signal or a no answer. Once a connection is made, the modems automatically detect and adjust to the incoming transmission speed. They can also initiate an automatic log-on sequence including control characters, ID number and password.

And both modems have extensive "Help" menus, a complete complement of built-in diagnostics, a programmable speaker, and two phone jacks on the back so both your phone and the modem can be connected to the same line at the same time. You can even switch between voice and data without interrupting the phone call.

### A Modem with a Memory of Its Own

The IBM 5841 stand-alone modem has some additional features you don't usually find on 1,200 bps modems. For example, the modem is switchable between asynchronous and synchronous modes and has a 20-entry Dialing Directory. Kept in non-volatile

# CModems

storage, the directory enables the modem to dial up and log on to systems automatically. This feature is most convenient when the 5841 is used with a fixed-function ASCII terminal such as the IBM 3161 or 3163.

The front panel of the 5841 has a complete array of eight LED Status Indicators to give you a quick visual check on what's happening.

## A Half-Card Is Better Than a Whole

Why? Because the IBM Personal Computer Modem can use a short slot in the IBM PC XT and the Portable PC. It also fits nicely into a full slot in the IBM PC and the PC AT.

Another nice touch is that a PC diagnostic diskette comes with each of these half-card modems.

## Standards & Compatibility

You'll be pleased to know that both modems meet the Bell 103/212A and V. 22 CCITT standards. Both

can use the industry standard "AT" command set, as well as the IBM command set. And both modems have been tested for compatibility with leading PC communications software such as the IBM PC Communications Manager, Crosstalk™, XVI, Smartcom II® and Transporter™.

So if you've been thinking about tying your PC into your company's computer, or accessing an outside data base for stock market information or airline schedules, or using electronic mail, or just exchanging information on a user group's bulletin board—then it's time you got an IBM modem for your PC.

For the Authorized IBM PC Dealer or the IBM Product Center nearest you—or for free literature—call 1 800 IBM-2468, Ext. 141/YU. Or contact your IBM marketing representative.



**Stand-Alone.**  
The IBM 5841  
1200 bps Modem

**Half-Card.** The IBM Personal Computer 1200 bps Modem



IBM  
DRM, Dept. YU/141  
101 Paragon Drive  
Montvale, NJ 07645

- Please send me information on the IBM PC Modems.  
 Please have an IBM marketing representative call me.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Phone \_\_\_\_\_



## Networking Raised to a Greater Power

Advanced Technology. With it, IBM tripled the speed of the PC and increased its memory capacity five-fold. Nowhere is this increase in computing power more important than in networking situations. If the AT's technological advances have prompted you to look into a multi-user network, you owe it to yourself to take a closer look at MultiLink Advanced™... a unique multi-tasking, multi-user networking system that runs programs under PC-DOS 3.0.

**Eight Workstations for the Price of an AT.** MultiLink Advanced™ represents the next generation in networking systems for IBM microcomputers. The system enables terminals, connected to a single AT, to emulate IBM-PC's having up to 448K of RAM (The PC-Shadow™ terminal, shown above, even has a PC look-alike, as well as work-alike keyboard and display).

This means that instead of spending \$3,000 per workstation for a PC with a Kilobuck "Network Interface Board," you can use inexpensive terminals . . . eight of which cost less than an IBM AT. Even if you need only one workstation connected to your AT, you'll realize significant savings.

**MultiLink Advanced™ ... Instant Access to All of Your Resources.** Central to most multi-user situations is the need to coordinate a variety of printers. With what's been described by *PC-Tech Journal* as "...by far, the best print spooler for the IBM PC," MultiLink Advanced™ gives users the option to print either at their workstations, or at a central location. In addition, programs and files can be shared by multiple users locally or through use of a modem. Just think of it . . . having remote access to an AT with a lightweight terminal modem.

Although designed to take advantage of the AT, MultiLink Advanced™ runs on all versions of PC-DOS, except 1.0, and certain implementations of MS-DOS. A wide range of leading programs are supported which include WordStar, dBASE III, Multimate, and Lotus 1-2-3.

**Get the Advanced Story Today.** Call The Software Link Today for complete details and the dealer nearest you. MultiLink Advanced™ is immediately available at the suggested retail price of \$495 and comes with a money-back guarantee. VISA, MC, AMEX accepted.

# Multilink™ ADVANCED



THE SOFTWARE LINK, INC.

IBM PC, AT & PC-DOS are trademarks of IBM Corp. MS-DOS, WordStar, dBase III, Lotus 1-2-3, and Multimate are trademarks of Microsoft Corp., MicroPro, Ashton-Tate, Lotus Development Corp., & Multimate International, respectively.

8601 Durwood Place, Suite 632, Atlanta, GA 30338 Telex 4966147 SWLINK

CALL: 404/998-0700

Dealer Inquiries Invited

CIRCLE 393 ON READER SERVICE CARD

THE SOFTWARE LINK, INC./CANADA

400 E. Main Street, Suite 16  
Markham, Ontario L3R 3K9

CALL: 416/775-1480

MultiLink Advanced™ & PC-Shadow™  
are trademarks of The Software Link, Inc.

# Kaypro 2000: Small but Hefty MS-DOS Portable

## FIRST LOOK

BY BILL MACHRONE

The Kaypro 2000 is a sleek, sophisticated MS-DOS portable. It is a strange stalemate to the Kaypros that have come before it. They've been rugged, low-cost, no-nonsense computers, a cross between a Jeep and a lunch pail. The 2000, by contrast, is more Ferrari than Jeep.

In one package, the 2000 combines a 24 by 80 liquid crystal screen, a 3½-inch disk drive, 768K bytes of RAM, a 300-bps modem, and a removable keyboard. The screen area, 3 by 9 inches, is masked off from a larger 6- by 10-inch display area, ready for better, cheaper displays in the future. You control the contrast from the keyboard, but it has only one view-

ing angle. To counter this limitation, the keyboard detaches from its berth and can be moved a couple of feet from the main unit.

The keyboard has a tilt mechanism and a lively touch. It manages to cram all of the IBM's functionality into a usable, although nonstandard, layout. The only thing I didn't like was the use of an auxiliary Shift key to get at the PgUp, PgDn, Home, and End keys.

### Pop-up Disks

The disk drive, with its clever pop-up access, packs an amazing 730K bytes. One drive is clearly enough if your religion permits mixing data and programs on the same diskette. With the 2000's ample memory, you can set up a RAM disk for speed and still have plenty

left over for your applications. A storage compartment holds two 3½-inch diskettes.

If you choose the Kaypro 2000, you may never have to buy software. It comes with *WordStar*, *CorrectStar*, *StarIndex*, *MITE* telecommunications, *PolyWindows Desk*, and *The Traveling Expense Manager*.

### A Heavy Burden

So who is this machine for? It's too heavy to be a portable in the Tandy 100/200 or NEC Starlet class. In fact, at 14 pounds, it weighs considerably more than my typical 10-pound briefcase, complete with a Tandy 100. It doesn't fit the Compaq mold of full compatibility and portability. So it fits a niche where you need the familiarity of MS-DOS programs but not data interchange at the disk level. ■



The 14-pound

Kaypro 2000 portable has a 24 by 80 LCD screen, 768K bytes of RAM, a 3½-inch floppy disk holding 730K bytes, and free software, including WordStar.

## PC FACT FILE

### Kaypro 2000

Kaypro Corp.  
533 Stevens Ave.  
Solana Beach, CA 92075  
(619) 481-4300  
List Price: \$1,995 (256K RAM); \$2,490 (768K RAM and a modem)

In Short: A 14-pound half-laptop, half-portable that runs MS-DOS programs from a 3½-inch floppy disk.

## Starlet Features WordStar In 6-Pound Laptop Package

BY BILL HOWARD

With the NEC Starlet PC-8401A-LS, NEC Home Electronics Inc. offers a reasonable—and in many ways superior—alternative to the Tandy 200 that was *PC Magazine's* Editor's Choice among low-cost portables ("Nine Laptops to Go," Volume 4

Number 25).

Compared with the Tandy 200, the Starlet weighs a pound more, has 8K bytes more RAM, a better keyboard and word processor, less-distinguished spreadsheet and manuals, and a 16-line by 80-character screen instead of 16 by 40. The Starlet lacks BASIC and a four-function calculator. The two laptops, however, are more alike than different; with built-in 300-baud modems, \$1,000

list prices, files stored in RAM, easy connections to PCs, and flip-up LCD displays.

The Starlet uses *WordStar-To-Go* rather than Tandy Corp.'s generic text processor.

Three programs complete the Starlet's repertoire: *Calc-To-Go* with a DIF option for exchanging spreadsheets with 1-2-3 and *Multiplicon*; *Personal Filer*, for storing a salesperson's name-and-address file; and *Telcom*, for transferring files via modem and checking electronic mail or for serial-cable transfers to PCs.

NEC's characters display nearly one and a half times as big as other 80-column LCD

displays. But Tandy, limiting itself to 40 columns, has still bigger characters.

NEC's 32K-byte usable memory fills quickly. A 32K expansion module (\$199) sticks out of its side. A better choice might be the \$399 SideStar 128K-byte module from Purple Computing (420 Constitution Ave., Camarillo, CA 93010; (805) 987-1742).

The Starlet has a few less-than-endearing traits: The screen noisily ratchets open and shut; *WordStar* comes up with right justification on; and the screen is a bit hard on the eyes in low light. ■

## PC FACT FILE

NEC Starlet PC-8401A-LS  
NEC Home Electronics Inc.  
700 Nicholas Blvd.  
Elk Grove Village, IL 60007  
(312) 228-5900

List Price: \$999

In Short: A 6-pound, LCD-screen laptop computer, similar to the Tandy 200, that comes with *WordStar*.

### Starlet and Tandy: NEC and NEC?

How the NEC Starlet stacks up against *PC Magazine's* Editor's Choice laptop.

	NEC Starlet PC-8401A-LS	Tandy Model 200
Price	\$999 (32K RAM)	\$995 (24K RAM)
Screen size	9½ x 3 inches	7½ x 4½ inches
Screen display	16 x 80 (480 x 128 dots)	16 x 40 (240 x 180 dots)
Weight	5.9 pounds	4.5 pounds
Footprint	11¾ x 8½ x 2½ inches	11¾ x 6½ x 2½ inches
Extra Memory	32K cartridge (\$199)	2 x 24K chips (\$249 each)



# **MICRO SPECIALS!!!**

**OKIMATE**

20

## **Color Printer**

**\$99.99**

## • DISK DRIVES •

<b>Toshiba NDO4D 1/2 Height DS/DD</b>	
disk drive 55B.....	98.50
<b>IOMEGA BERNOULLI BOX</b>	
20 MB (2-10 MB in cabinet).....	2389.00
10 MB.....	1699.00
<b>MINISCRIBE</b>	
20MB 3 1/2" shock mounted hard drive	
Complete with controller.....	749.00
<b>TALLGRASS</b>	
Hard drive sub system with backup	
NEW! TG-5025.....	2527.00
TG-6135.....	CALL

**• TAPE BACK UP SYSTEMS •**

Tecmar QIC 60H

*External XTI/AT).....* 1495.00

**• DISPLAY CARDS •**

## Paradise

**Modular Graphics Card.....** 279.95

*Tecmar Graphics Master.....* 469.00



Toll Free  
Out-Of-State

**1-800-634-4884**

**New Brunswick Avenue  
Edwards, NJ 08863**

In New Jersey Call

**(201) 370-4800**

# MAIL

**OKIDATA**  
182  
PRINTER  
IBM COMPATIBLE  
Only  
**\$199**



• MODEMS •

Hayes

Smartmodem 1200 RS-232 ... 389.95

Smartmodem 1200B ... 329.95

with Smartcom II ... 359.95

Smartmodem 2400 Baud ... 579.95

CPI

Hook-up w/Relay Software ... 349.00

CERMETEK

1200 SPC Internal with Crosstalk ... 249.95

1200SPC w/o software ... 209.95

2400 Modem ... 459.95

• LOCAL AREA NETWORK •

AST

AST PC Net Starter Kit ... 795.00

AST PC Net II Starter Kit ... 795.00

• HARDWARE MISC •

Computer Power

Power Strip ... 29.95



Not responsible for typographical errors.

Immediate replacement or repair of defective goods at our discretion.

We welcome Corporate Accounts.

NJ residents add 6% sales tax.

20% restocking charge for all returned non-defective items.

All items subject to availability.

ALL PRICES subject to change without notice.

Allow 1-2 weeks for personal checks to clear.

FREE technical support!

All prices are cash prices, add 3% for credit card.

Min Shipping & Hdlg - \$95

CIRCLE 233 ON READER SERVICE CARD

Prompt & Efficient Service

Unsurpassed Technical Support

ALL AT

Unbeatable Prices

• MONITORS •

AT&T Monochrome Monitor ... \$195.00

PRINCETON

HX-12 RGB Color ... 449.95

MAX-12 Amber TTL ... 178.95

SR-12 ... 579.00

SR-12 w/Scan Doubler ... 785.00

TAXAN

NEW! 640 ... CALL

BoB board for 440/640 ... 379.00

122-12" TTL-Amber ... 139.95

121-12" TTL-Green ... 149.95

• LASER PRINTERS •

Ricoh/Oasys ... CALL

• PLOTTERS •

Epson HI-80 ... 395.00

• PRINTERS •

Diablo

D80 IF ... CALL

EPSON

LX-80 ... 239.95

CALL FOR OUR LOW PRICES

ON ALL EPSON PRINTERS

OKIDATA

182 ... 199.00

CALL us for our low prices on all OKIDATA printers

NEC

CALL for our low prices on all NEC printers



Credit Cards  
Accepted

# Norton Utilities: Still the Best?

BY WINN L. ROSCH

For years, *The Norton Utilities* have been the standard choice for adding powers to DOS that its writers forgot. The latest update, Version 3.10, adds even more abilities.

Now, less expensive products—*PC Tools* from Central Point and the *File Recovery System* from Brown Bag Software—offer similar enhancements and threaten *Norton's* dominance.

*The Norton Utilities* are known primarily for their file recovery abilities.

In Version 3.10, the intricate NU (main) program has been tamed somewhat by revising its default selections. Repeatedly pressing the Enter key is now enough to recover a file without a glance at the instructions. The 3.10 package also includes a pair of worthy new features—QU, or Quick Unerase, which can recover one file or a whole disk of them using a quick-and-easy query system, and a program to recover inadvertently removed subdirectories.

Also included in *The Norton Utilities* are short programs that make everyday disk use more convenient, including a file-and-disk-erase utility that now will overwrite specifications.

## PC Tools: Not a Clone

Although *PC Tools* from Central Point Software (maker of *Copy II PC*) has many of the same features as *The Norton Utilities*, it can't be called a clone. Functions are in a single menu-driven program aimed more at superseding DOS commands than enhancing them. File copying, searching, sorting directories, printing, comparing, deleting, verifying, and changing individual bytes in a file or on-disk, are controlled through a consistent and logical menu system.

Unlike *The Norton Utilities*, *PC Tools* can be made memory resident, so you can call up all

of its power from the middle of other programs.

*PC Tools* enhances DOS with easy-to-use file recovery utilities, which work in most circumstances (but not as many as *Norton*), a map of disk space used, and a system information function that duplicates most *Norton Utilities* features.

## File Recovery System

*File Recovery System* from Brown Bag Software includes most of the features of the other two—file recovery, disk

### QUality

QU-Quick Unerase, Version 3.10, (C) Copy 1984-86, Peter Norton

There are 4 erased files in this directory  
all of them may possibly be Quick-Unerase

Erased files lose the first character of their names  
After selecting each file to Quick-Unerase, you will be  
asked to supply the missing character

```
TEST.1      11,661 bytes 12:59 am Tue Jan 1 88
The filename 'TEST.1' will be used for the new Quick-Un erased file
```

```
TEST        1 bytes 1:04 am Tue Jan 1 88
The filename 'TEST' will be used for the new Quick-Un erased file
```

```
TEST.2      1,334 bytes 4:40 am Tue Mar 19 88
The filename 'TEST.2' will be used for the new Quick-Un erased file
```

```
TEST.3      11,187 bytes 4:14 pm Mon Feb 4 88
The filename 'TEST.3' will be used for the new Quick-Un erased file
```

C:\>

The Norton Utilities Quick Unerase feature, new in Version 3.10, can recover multiple lost files from a single disk.

editing, directory sorting, and changing disk labels. It permits you to dig into the file allocation table, recover data from bad sectors, and even try to lift information from non-DOS disks and disks that have been formatted over.

*File Recovery System* claims to be the only file recovery program to work on DOS 1.0 and later, and on all hard disks. However, *PC Magazine* was unable to substantiate the latter claim. It would not recover a file from a disk emulator and refused to work at all on a PC's Limited AT. Both of those tasks were accomplished by the *Norton* and *PC Tools* programs.

For simple file recovery,

*Norton's* Quick Unerase and *PC Tools* will probably take less time and trouble. When situations get tough, as with interwoven and multiple erased files, *File Recovery System's* power makes it the equal of *Norton*, however. And only *File Recovery System* will make an attempt to get data from physically damaged disks.

An enhanced version is promised, with added features to completely wipe files from a disk so that they are unrecoverable, rearrange disks so files are contiguous, and recover blocks of files with a single command.

## Disk Mechanic

*Disk Mechanic* from MLI Microsystems, like *File Recovery System*, gives you intimate

mettle. These programs are, in fact, inexpensive and different enough (even complementary) that you might just want more than one in your library. ■



## FACT FILE

### The Norton Utilities,

Version 3.10

Peter Norton  
2210 Wilshire Blvd., #186  
Santa Monica, CA 90403  
(213) 826-8032

List Price: \$100, update \$25  
Requires: 128K RAM, DOS  
2.0 or later.

In Short: Improved ease of use in Version 3.10, especially file recovery. Norton remains the class act in a now crowded field of DOS utilities.

### PC Tools

Central Point Software  
9700 SW Capitol Highway,  
#100  
Portland, OR 97219  
(503) 244-5782

List Price: \$39.95  
Requires: 192K RAM (256K for resident operation).

In Short: Economical, menu-driven, memory-resident DOS command and enhancement program with unerase capabilities.

### File Recovery System

Brown Bag Software  
15100 El Camino Grande  
Saratoga, CA 95070  
(408) 395-9568

List Price: \$49.95  
Requires: DOS 1.0 or later,  
128K RAM.

In Short: File recovery combined with disk drive manipulation and control functions.

### Disk Mechanic

MLI Microsystems  
P.O. Box 825  
Framingham, MA 01701  
(617) 926-2055  
List Price: \$70  
Requires: 192K RAM on a  
PC or XT, 256K RAM on an  
AT, and 320K RAM on a  
Compaq.

In Short: File recovery is one feature of this veteran disk manipulator.



## Alloy's Streamliner Series. The best protection for your company's past, present, and future.

The best protection for your personal computer data storage needs is available today. From Alloy. Choose tape only. Or combined disk and tape. Either way, the Streamliner Series provides the performance you expect from the leader. At a remarkably affordable price.

Alloy's FT-60 streaming tape backup subsystem gives you up to 60Mb storage capacity and high-speed data transfer. The SL-60 models give you the same high quality tape unit *plus* integral hard disk. And you can choose 20Mb or 41Mb formatted data capacities.

With Alloy's Streamliner Series, you'll get the best protection for your company's past, present, and future. So call Alloy today at (617) 875-6100.

**ALLOY**  
Computer Products, Inc.

100 Pennsylvania Avenue, Framingham, MA 01701 (617) 875-6100, TWX 710-346-0394  
In Europe: ALLOY Computer Products (Europe) Ltd., Cirencester, Gloucestershire, England. Tel.: 0285 69571 Telex: 43340  
CIRCLE 202 ON READER SERVICE CARD

## COMMUNIQUES EDITED BY BILL HOWARD

*If You Can't Beat 'em, Beat 'em with a Club*

Hercules's products."

While supplies last, the dolls are available by calling (800) 532-0600 from 9 a.m. to 8 p.m. EST.

In a similarly violent vein, Compucure Corp. (P.O. Box 105, Hilton Head, SC 29925; (800) 681-9460), a PC-to-mainframe repair company, introduced the Hacker Whacker, a maple-handle, aluminum-head mallet.

The Hacker Whacker is \$9.95, available so far in only one state—the land of nuts and chips—California. ■



The Hercules monochrome graphics standard is so popular, it's being imitated by a half-dozen other makers (see "EGA Standard Evolves for PC Graphics Users," page 33). Like Rambo, Hercules Computer Technology wants to fight back. The company was giving away, through the end of January, 5½-inch Hercules dolls "designed to demolish cheap imitations of

*The PC Still Has Its Cover Completely On, But I'm Down to My Underwear*

It's safe to speculate that IBM probably didn't have this computer game in mind when it opened the PC's architecture to the world. *Play Strip Poker With Fifi* allows PC users to match poker wits and the ability to stay dressed with any IBM PC or compatible.

The rules of the game are simple: If the player's hand beats the computer's, the on-screen image of Fifi sheds one of her garments to raucous background music. The image "blushes" when sensitive anatomy is revealed. Players are theoretically honor-bound to respond in kind when they lose.

Ray Frederick, whose Seray Software markets *Strip Poker* (\$29.95), says the program accommodates only one player at a time, so it can't be used as an icebreaker. And while you can get Fifi to take it all off, says Frederick, "by the time you go

*It Happened in Las Vegas*

COMDEX exhibitors keep track of visitors to their booths by running the plastic show identification cards, embossed with the holder's name and address, through credit-card-like machines that produce multi-copy slips. This year, one attendee raised eyebrows by asking for his carbons back.

*Microsoft Windows* was one of the show's hottest new pieces of software, but try telling that to the boys on the street: A *PC Magazine* editor had his car broken into in a Vegas hotel parking lot. The discriminating thief found three unopened Windows packages in the trunk—and left them. ■

*We Never Noticed Much Difference*

A friend in Texas passed along the second-funniest PC joke we've ever heard, surpassed only by the classic Apple knock-knock joke \*:

*Q: What's the difference between a used-car salesman and a computer salesman?*

*A: The used-car salesman knows when he's lying.*

If you've heard a better one, pass it along to Communiqués. We'll pay you \$50 and throw in a *PC Magazine* T-shirt. The

best jokes will be published in a future issue. Jokes must be about computers and cannot be off-color; otherwise, the field is wide open. Include your name, address, and a phone number where you can be reached during the day. ■

\* "Knock, knock." "Who's there?" ("Incredibly long pause.") "Lisa." ■

*Love at First Byte*

Panda and Azure first met as "Plinkers" in January of 1985. They were married the following October.

Plinkers are subscribers to the People/Link recreational videotex network, and Panda and Azure are Pamela Ann Falejczyk and Mark Crosby, a Chicago marketing presentation coordinator and a Dallas engineer, respectively. The couple exchanged pictures, met face to face, and quickly became engaged.

The bride stressed that People/Link is not a computer dating service. Rather, it's described as a "sophisticated, computerized version of citizens band radio." ■



Frederick says that there's no *Play Strip Poker With Tam Selleck* for the ladies. To get a copy of *Play Strip Poker With Fifi*, contact Seray Software, P.O. Box 510, Harvard, MA 01451. ■

*Cure Winter Doldrums*

Heard anything unique or off-beat about the computer world? We pay \$50 for every item published. Send your submissions to Communiqués, *PC Magazine*, One Park Ave., New York, NY 10016; (212) 503-5293, MCI Mail 157-9301. ■

*Then There's Bar Code News . . .*

The computer magazine business succeeds best addressing specific markets rather than mass audiences, says publicist Ron Gold. "Being popular or creative isn't enough," he says.

In researching new markets for his *Personal Computer Publicity Book* (\$125, \$200 with disk from Gold, 1341 Ocean Ave., #366, Santa Monica, CA 90401, (213) 399-7938), Gold came up with these real-life, ultra-vertical market magazines that may be targets for people with computer products to sell: *Sludge Newsletter*, *Breeder & Feeder*, *Exhaust News*, *Weeds Today*, *Backflow Prevention*, *Pig International*, *Wrench & Bench*, *Butter Fat Magazine*, *Hose & Nozzle*, and *Gabbles*.

This is not a joke, Gold says. The magazines all exist. ■

# PreCursor™ Makes The Hard Disk Easy.



Only  
\$69.00

30-DAY MONEY BACK GUARANTEE

PreCursor™ is an amazingly compact and sophisticated indexing system for your hard disk. It runs just ahead of your other applications and makes some very user-friendly arrangements. And at a very businesslike price.

Without PreCursor™, it takes a whole manual of commands to find and execute programs from your hard disk. In a business setting, where novice users must access your system, this is aggravating and expensive.

Tailoring PreCursor™ to your system is an easy operation. On-line help is available at the touch of a function key. A triple level of password protection is built right in. You don't need to know paths or subdirectories or other complicated syntax. You can even change the color of PreCursor™.

After PreCursor™ is setup on your hard disk, it greets you each time the machine is turned on with a list of available programs. You can make simple index choices of even the most complex DOS commands. And set up your printer with the speed and ease of an old pro.

If you're a sophisticated user, you'll love the convenience of full interaction with batch files, passable parameters and user prompts. Home users will appreciate the sure ease of operation.

If you depend on your hard disk for businesslike performance, you can rely on PreCursor™ for instant access.

Thanks to PreCursor™, The Hard Disk isn't so hard anymore.

CIRCLE 190 ON READER SERVICE CARD

Dealer Inquiries Welcome

PreCursor™ will run on IBM compatible MS-DOS systems.

IBM is a registered trademark of International Business Machines Corporation.

## Make My Hard Disk Easy!

<input type="checkbox"/> Here's my order for _____ copies.
<input type="checkbox"/> Send me check for \$69.00 each enclosed (plus \$1.00 for postage and handling)
<input type="checkbox"/> Please charge this purchase to my <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard # _____
Card # _____ Exp. Date _____
Name _____
Title _____
Company Name _____
Address _____
City _____ State _____ Zip _____

Texas residents add 5.25% sales tax (Houston residents - 6.125%).  
Outside U.S. please add \$15. Checks must be on a U.S. bank  
and in U.S. dollars. Sorry, no C.O.D. or purchase orders.

Sent to: PreCursor

The David L. Aldridge Company, Inc.

140 Town & Country Village, Houston, Texas 77046  
To place credit card orders by telephone, call 713-464-7469 or,  
toll free, call 800-536-8572 ext 822; in Calif., call 800-472-3420 ext 822.

**PreCursor**

# THE IBM PC-AT™ ONLY HAS THREE STRIKES AGAINST IT.



## PERFORMANCE.

With PCturbo 186™ your IBM PC or XT can run 200-400% faster. That's much faster than the AT. It's faster than any other accelerator board, too. And the optional 8MHz 8087-2 makes it faster still.

	Lotus 1,2,3*	Frame-work*	AutoCAD*
IBM PC	243	90	85
PC AT	84	N.A.*	37
PCturbo 186	82	43	35
PCturbo 186/87	N.A.**	12	23

Benchmark tests. All times in seconds.

\*Future version 1.1 of Framework will be AT compatible.

\*\*Future release of Lotus will support 8087.

## PRICE.

You get more than 100% of the performance for less than 15% of the price.

## COMPATIBILITY.

The AT is only 70% compatible with the IBM PC. PCturbo 186 is 100% compatible. So you can run *every* popular PC program.

You get more RAM, too. Up to 768K on-board, for a system total of up to 1.4 Mbytes. And PCturbo 186 installs in one simple step. Call 415-490-8586 for your dealer's name. PCturbo 186 puts AT performance in everyone's ballpark.



**ORCHID**

47790 Westinghouse Dr., Fremont, CA 94539,  
TLX: 709289

PCturbo 186 is a trademark of Orchid Technology. IBM PC-AT is a trademark of International Business Machines, Inc. Lotus 1,2,3 is a trademark of Lotus Development Corp. Framework is a trademark of Ashton-Tate. AutoCAD is a trademark of Autodesk, Inc.

## ■ FROM THE EDITOR'S SCREEN ■ BILL MACHRONE

# UNBRIDLED OPTIMISM

*Some people still think that the computer industry is going through a slump. But if this is a slump, why is everyone so cheerful?*

The marketplace has changed over the last year. Remember how everyone was speculating that IBM would introduce a closed-bus PC 2 or switch to a proprietary operating system? Only IBM, the theory went, could be big enough and dumb enough to kill the goose that laid the golden egg.

IBM is certainly big. But it isn't dumb. Oh, some of its products and decisions may seem dumb to you and me, but that's because they really aren't targeted at us. You'd have to search far and long before you could find someone who thinks that IBM is going to close the bus, but there are a few diehards within IBM who dream of doing their own operating system, poor be-nighted souls.

Last year there was talk of how the industry was unhealthy. Too much imitation, not enough innovation. We were sitting ducks for the Japanese, as the story went.

What are people worried about this year? Not much, as it turns out. No one cares if IBM introduces a new standard. The Japanese can sell us all the chips and disk drives they want, but they still can't establish a beachhead for a PC-compatible machine. In fact, the Japanese are plenty worried about the Taiwanese and Korean machines. They cost less and are more compatible than most of the Japanese offerings.

How did this state of affairs come to be? IBM has the marketing muscle to do anything it wants, right? Why aren't manufacturers quaking and quivering in the giant's shadow?

**WHO NEEDS IBM?** I've said it before and I'll (doubtless) say it again: IBM fails only when it is not IBM-compatible. Machines like the PCjr and the 3270 PC had one common flaw—they didn't run enough of the PC's mainstay programs. I shouldn't talk about the 3270 PC in the past tense, but orders for the machine are way off. Users have discovered that they can do a lot more with a standard PC and any of the 3270 adapter cards. So Compaq, AT&T, and Tandy didn't have to do slavish copies of the 3270 PC. The aftermarket did the hard part for them.

The compatibles manufacturers have powerful allies in companies like Phoenix Software Associates and Microsoft. Phoenix writes the ROM BIOS compatibility programs that make many compatibles work like IBM machines. They dance the thin line between compatibility and copyright infringement, and they do it well.

The market, meanwhile, has deter-

mined that PC-DOS is the only operating system it wants on the PC. Since Microsoft is free to sell the generic version of DOS to compatibles manufacturers, it has created a software bus that surpasses even the PC's hardware bus in universality. "Well-behaved" programs that follow all the DOS rules for interaction with the machine will run on virtually anything that runs DOS. A year ago, it wasn't so important to be well-behaved: No one was talking about multitasking, and applications programs were free to take over the machine if they wanted. Then all those RAM-resident utility programs started interfering with one another and the programs they were supposed to be supporting, and people started to realize that rules were a good thing.

Meanwhile, the marketplace doesn't seem to mind if Microsoft changes DOS to its heart's content as long as it offers some kind of backward compatibility. So Microsoft has gotten a little tougher about the rules and will get tougher still.

**CAN WINDOWS WORK?** It's hard to talk about a product that took 24 months to introduce as a bold step, but that's what *Microsoft Windows* is. It is a harbinger of the future—a future that transcends hardware compatibility. *Windows* has its problems. It needs a hard disk or a fast networked file server. It often needs more speed than a standard PC can muster. It also requires a graphics card, preferably the Enhanced Graphics Adapter. But it provides a consistent user interface and takes thousands of bytes of code out of applications software. And it multitasks.


Illustration: Mark Pohlman

# • COMPUTER PRODUCTS UNLIMITED •

## THE CPU SYSTEMS

**SYSTEM 1** 440K, 2 DS/DD Drives w/  
Controller and 135 Watt  
Power Supply **\$679**

**SYSTEM 2** 640K, 2 DS/DD Drives w/  
Controller, 135 W Power Supply, Hercules  
Compatible Color Card  
w/Par Port & Green Mon **\$799**

**SYSTEM 3** 440K, 2 DS/DD Drives w/  
Controller, 20 MB Hard Disk, Hercules  
Compatible Monocard &  
TTL Mono Monitor **\$1299**

CPU PC-AT Call for Price

All System pricing subject to change w/o notice

## COMPUTER SPECIALS

IBM PC Barbone 54K w/Controller **\$1299**

IBM XT Barbone, 1 disk, 135W ps **1799**

IBM AT Barbone Unit **2995**

Compaq Portable 2 DS/DD Drives, 256K **1829**

Compaq Desktop 2 Drives, 256K, Monitor **2195**

All Designs Available - Call

CPU's COLOR CARD  
WITH PARALLEL PORT **\$95**

## MONITORS

AMDEX	PRINCETON	
300A	512H X12	\$429
310A	14B SR12	Call
COLOR 300	19B MAX12E	189

## FEATURES

SPS 3000 10 Mhz, 4.77MHz  
Processor, 63 MB RAM, 10  
Ports 80 bit heating point  
numbers

**DS/DD DRIVES:** Floppy disk  
drive, 3.5" 1.44MB, 3.5" 720KB  
and external 360K DS/DD  
drives, 10MB hard disk opt.

**MS BLASTER:** IBM compatible  
sound

**MEMORY:** 640K

**MONITOR:** 13" 640x400 16 colors

16 keypads, 57

typewriter style, caps & num  
lock Wright

**COMPUTER TYPE:** 5-in-1 Win  
95, DOS, OS/2, LAN & Net, DOS/OS/2

**POWER SUPPLY:** 156 Watt  
MS-205

**POWER REQUIREMENT:** 110 Volt

WATTAGE: 47 Watts



**\$999**

## THE CPU CPU

CPU's XT PC Series 85  
w/Color Card, Par. Port, Monitor

256K Memory & 2 DS/DD Drives

Exceptional Compatibility

More Features than IBM PC/XT

FREE

Six Month Extended Warranty

ORDER NOW and we'll Throw-in

a Tilt and Swivel Stand for  
the Monitor and Free Shipping

## ADD-ONS

BMC Monitor

12" Green

**\$45**

FREE Tilt and Swivel Stand  
with computer purchased

AST SIXPACK

with 384K

**\$249**

## AST ADVANTAGE

**\$399**

Multifunction Memory Expansion Board  
for IBM PC-AT with 128K

## XT POWER SUPPLY

135 Watt

**\$89**

## FLOPPY DISK & HARD DISK DRIVES

TANDON 100-2  
DS/DD  
FULL HEIGHT

**\$85**

30 MEG  
Hard Drive  
with Controller

**\$695**

TEAC 55B DS/DD

**\$82**



PRINTER CABLE

**\$8**

PARALLEL PORT

**\$59**

CONTROLLER CARD

**\$45**

Compaq  
4 Drives  
100% PC  
Compatible

10 MEG  
Hard Drive  
with Controller

**\$395**

20 MEG  
Hard Drive  
with Controller

**\$479**

HERCULES MONOCARD  
with Software

**\$279**

HAYES MODEMS

1200 External

**\$429**

1200 Internal

**\$319**

SONY  
RGE Color TV  
& VHS Movie  
Remote Ctrl

**\$499.00**

TISS &  
SWIVEL  
STAND

**\$20.00**

BMC  
12"  
Amber

**\$65.00**

AMDEK  
COLOR  
300

**\$189.00**

## MONITOR INTERFACES & GRAPHICS CARDS

HERCULES

Color Card

430

IBM  
Monocard

5119  
5119  
Card

PENNET  
SOS Board

430

JUKI  
6100

15slope LD

**\$339.00**

EPSON  
FX185

Printer

**\$479.00**

## PRINTERS

STAR MICRONICS

SG110 (120cps)

SG110 (120cps, 15" Car.)

## ■ FROM THE EDITOR'S SCREEN

*DESQview* is the windowing system for today, *Microsoft Windows* is the windowing system for tomorrow. *DESQview* takes all your existing software and runs it, in character mode, on your existing system, with the help of Rampage! on a similar enhanced extended memory spec card. It makes your applications think that each of them has exclusive access to all the machine's memory when they are actually bank-switching.

*Microsoft Windows* does much the same thing, but it is pickier about which programs can share the display. Basically, an application has to be written to *Windows'* specs if it is to share the screen successfully with other applications. Microsoft is currently in the process of rewriting all of its applications software to run under *Windows*. Several other major software developers are following suit. It is the beginning of a new wave of products that will offer *Windows*-specific versions.

What the software publishers give up in speed and uniqueness today, they will regain many times over tomorrow. They will reap a harvest of compatibility with future graphics cards and output devices. Software companies have been working too hard on hardware compatibility. It's time for them to hand off to Microsoft and the hardware manufacturers.

Think about it: A new laser printer comes on the market. It does everything from letter quality to 600-dots-per-inch graphics at 20 pages per minute for a thousand bucks. You order 50 of them for your company. Now all you have to do is convince 25 different software vendors that they should support this new miracle. If these products ran under *Windows*, you would need one driver. The printer company could write it. Once. The graphics card situation is much the same: You're using a standard color/graphics adapter today, and a \$149 knockoff of the IBM Enhanced Graphics Adapter comes out tomorrow. A quick reinstallation of *Windows* for the new board and you're in business. All your gray-on-black graphics blossom into 16 vibrant colors.

### LEARN THROUGH REPETITION

I don't mean to be tiresome, but here, once again, is the bottom line: Device drivers are the province of the operating system,

not the applications program. It doesn't matter what hardware you have if you have the right operating-system software.

This is the main reason for the optimism among compatible manufacturers. They

stand ready to produce (some already are producing) the faster machines necessary to shoulder the greater burden. A better operating system will do some things slower, but in the end, we'll all come out ahead. ■

# Lattice Works

### NEW PROGRAMMER'S SCREEN EDITOR INTRODUCED

Designed specifically for programmers, the Lattice Screen Editor (LSE) is a fast and flexible, multi-window editor that is also easy to learn and use.

LSE runs under MS-DOS or PC-DOS on most popular machines with 128Kb memory. It provides standard editor functions such as block moves, pattern searches, and "cut and paste". In addition, LSE offers special features for programmers such as an error tracking mode and three assembly language input modes.

A complete installation program is included to remap any of LSE's 48 keyboard functions. Menus, prompts, help messages and default file extensions can also be customized for individual user preferences. \$125.00.

### LATTICE TOPVIEW TOOLBASKET NOW AVAILABLE

Providing more than seventy functions, the Lattice TopView Toolbasket is designed for software developers writing applications for IBM's TopView multi-tasking, multi-window environment.



**Lattice**

Phone (312) 858-7950 TWX 910-291-2190

INTERNATIONAL SALES OFFICES:

Belgium: De Vooght, Phone (32) 2-720-91-28 England: Roundhill, Phone (0672) 54675  
Japan: Lifespan Inc. Phone (03) 291-4711 France: SSDL, Phone (1) 666 1155

CIRCLE 113 ON READER SERVICE CARD

The Toolbasket functions eliminate the need for extensive use of assembly language when interfacing with TopView. The Toolbasket's library includes functions to control window, cursor, pointer, and printer operations. It also provides access to TopView's cut-and-paste facilities and offers debugging services.

The Toolbasket runs on the IBM PC, XT, AT, and compatible systems with 256Kb memory. \$250.00. Binary and source code is available for \$500.00.

### LATTICE CREATES C COMPILER FOR COMMODORE AMIGA

Amiga C, produced by Lattice for the Commodore Amiga, supports the Amiga's 68000 microprocessor and offers the same high speed and extensive capabilities of the MS-DOS Lattice C compiler currently used by more than 30,000 software developers worldwide. Available from both Commodore and Lattice. \$300.00.

In addition, Lattice also offers cross compilers that allow you to develop Amiga programs on MS-DOS or UNIX systems.

Contact Lattice, to discuss your programming needs. Lattice provides C compilers and cross compilers for many environments including Tandy, Sony, Hewlett-Packard, Tandem, and IBM Mainframe. Corporate license agreements available.

# What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

## And DISK WORLD! has it.

Introducing Super Star Diskettes:  
the high quality diskette with  
the lowest price  
and the best LIFETIME WARRANTY!

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette... no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/100th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying "higher quality."

The extra money might be coming from their advertising, snazzy packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

### How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers.

Rather, they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and passing their labels on to the public.

The new IBM diskettes, for example, are one of those. So are IBM 5 1/4" diskettes. Same for DYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices... without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications... specifications which were higher than most... and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.

### FRAUD ALERT!

Please be careful!

A lot of the "no-name" diskettes flooding the market at prices of less than \$1.00 are what we in the industry call "floor sweepings."

In other words, they're garbage... stuff that six months ago, no self-respecting manufacturer would have sold.

But times got tough and some people's companies got a little lost in desperation... and so a lot of computer users are getting some really bad disk... and it's not bargain at all.

So, when the price seems too good to be true... like 39 cents, be careful... very careful!

### HOURS:

8AM-6PM Central Time, Monday through Friday



Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Polywrap-molded cardboard sleeves, reinforced hub, user ID labels and write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years... without knowing it.

In our search for the low priced, high quality diskettes of our dreams, we found something even more interesting. We found that there are several manufacturers who do not have their own computer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concantrate their efforts on turning out the highest quality diskettes they can... because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them... and sell them for much higher prices to you!

After a while, software publishers or computer manufacturer or diskette marketers start to see a profit on a diskette they want to work time after time, everyday. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

### HOW TO ORDER:

#### ORDERS ONLY:

1-800-321-2227  
(In Illinois: 1-312-256-7140)

#### INQUIRIES:

1-312-388-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL.  
Our address is DISKORDER. It's a FREE MCI MAIL  
letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5 1/4" DISKETTES—Add \$3.00 per each  
100 or fewer diskettes. OTHER ITEMS: Add shipping charges  
as shown in addition to other shipping charges. PAYMENT:  
VISA, MASTERCARD and Prepaid orders accepted. CCO DR.  
DISKORDER, 1000 N. Cicero, Chicago, IL 60645.  
FPO, AR, HI & PR ORDERS: Include shipping charges as  
shown and additional 5% of total order amount to cover P&H  
and insurance. We ship only to United States addresses, except  
to U.S. Army Post Office boxes. TAXES: Illinois residents, add 7%  
sales tax.

MINIMUM ORDER: \$25.00

Super Star Diskettes. You already know  
how good they are. Now you can buy  
them... cheap.

Well, that's the sha story.  
Super Star diskettes don't roll off the beat boat from Pago-  
Pago or amera from a basement plant just east of  
Nowhere.

Super Star diskettes have been around for years... and  
you've used them for years as copy-protected software  
originals, unprotected originals. Sometimes, depending  
on where you live, you may have never heard of them.  
They've been on a Super Star shelf. And maybe more than once,  
you've bought a box on two or more of Super Star diskettes  
without knowing it. They just had some "big" company's  
name on them.

Super Star Diskettes are good. So good that a lot of  
major software publishers, computer manufacturers and  
other diskette marketers buy them in the tens or hundreds  
of thousands.

We buy them in the millions.  
And then we sell them to you.  
Cheap.

### When every little bit counts, it's Super Star Diskettes.

You've used them a hundred times... under different  
names.

Now, you can buy the real McCoy, the same diskette that  
major software publishers, computer manufacturers and  
diskette marketers buy... and call their own.

We simply charge less.

### Super Special!

Store 75 diskettes for only \$5.95!

Yep, that's right. \$5.95  
Super Star diskettes for only \$5.95  
plus shipping and handling.  
It includes a Media Protect  
Disk MINDER II, a well  
made unit that we're impressed  
with.

It holds 75 diskettes  
securely and looks nice too!

### The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted  
against defects in original material and workmanship  
so long as owned by the original purchaser. Returns  
are simple: just send the defective diskette with proof  
of purchase to us. We will inspect it, make a full evalua-  
tion of the problem, and we'll send you the replacements.  
(Incidentally, coffee stained diskettes and  
diskettes with staples driven through them don't  
qualify as "defective".)

WE WILL MEET OR BEAT ANY NATIONALLY  
ADVERTISED PRICE.

ON THE SAME PRODUCTS AND QUANTITIES  
SUBJECT TO THE SAME TERMS AND CONDITIONS.

629 Green Bay Road  
Wilmette, Illinois 60091

**DISK WORLD!, INC.**

# PC NETWORK GOES TO THE

# O R I E N T

# DIRECT

How do you suppose most manufacturers of personal computer products get started?

They go to the Orient... taking either their designs or simply their ideas to one or more of the major electronics manufacturing concerns, getting bids for making these devices under contract to the creators. Multifunction Cards, Video Cards, Disk Controllers, Modems and I/O Boards all begin their life in this way.

This relationship between the manufacturing capabilities of the East and the design and marketing talents of the U.S. has resulted in the incredible selection of enhancement products for the IBM and Apple computer markets.

Well, with 100,000 members and growing strong, The Network sent its buyers east to visit some of these manufacturing

concerns to check out the feasibility of directly importing these products in the necessary volumes to *save our members money!* What they came back with was astounding.

Now, we always figured that there were some pretty substantial markups as these hoards came into the country and got fancy boxes and marketing promotions under any one of a number of well known brand names in the peripheral add-on markets but *we had no idea they were so large!*

To prove our point, consider what they brought back. Each board is constructed to the same precise specifications, on exactly the same machinery as their name-brand duplicates. The difference? As a *Network member, you pay only 8% over our unusually low wholesale price... and you get our full 1 year warranty!*

### Hercules™ Smarter Brother

A Monochrome Graphics Card with Printer Port...100% compatible with Hercules™ products...



Wholesale price...

**\$99.00\***

### Graphics Printer Interface

If all you want is a printer, this is the card for you. Supports all text and graphics printer features.

Wholesale price... **\$29.00\***



### The "9" Pack Plus™

Multifunction like the AST™ "6" Pack™ ...up to 384Kb of expansion memory, 1 serial, 1 parallel, and 1 game port, a clock/calendar and 3 software packages standard.



With 0 K...

**\$89.00\***

Wholesale

### IBM Color Card

100% compatible with the IBM offering. The wholesale price?

A mere **\$69.00\***



### The I/O Double Plus™

If you don't need memory—just ports, identical I/O board to the AST™ I/O +™ with 2 serial, (1 standard) 1 parallel, 1 game port and clock/calendar with software.

Wholesale price...

**\$69.00\***

### 512 K Memory

The least expensive way to add memory to your current system. With 0 K installed.

Wholesale priced at only...

**\$69.00\***



TM Six Pack, I/O Plus and AST are all registered trademarks of AST Research Inc. Hercules is a registered trademark of Hercules Computer Technology Inc.

\*PC NETWORK Members pay just 8% above this wholesale price, plus shipping. All prices reflect a 3% cash discount. Minimum shipping \$2.50 per order. International orders call for shipping & handling charges. Personal checks please allow 10 working days to clear.

CALL TOLL-FREE 1-800-621-SAVE In Illinois Call (312) 260-0002

# PC NETWORK

GET THE NETWORK ADVANTAGE!!!

# PC NETWORK

## BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%, AND GET 14-30 DAY SOFTWARE RENTALS†...

Every few months, The **NETWORK** saves its members more than \$24,000,000 and processes over 100,000 orders.

### The nation's largest corporations depend on PC NETWORK!

On our corporate roster are some of the nation's largest financial, industrial and professional concerns including some of the most important names in the computer industry:

AT&T	General Motors
Barclays Bank	Gillette
Bell & Howell	Hewlett Packard
Citibank	Hughes Aircraft
Columbia University	IBM
Deloitte General	ITT
Exxon	Kodak
Farm Bureau Insurance	United Airlines
Frontier Airlines	University of Illinois
General Mills	Yale University
General Electric	Veteran's Administration

plus thousands of satisfied consulting firms, small businesses, user groups, municipalities, government agencies and value-wise individuals ACROSS THE NATION! Their buyers know that purchasing or renting from PC NETWORK saves them time, money and trouble. They also count on us for product evaluation, professional consultation and the broadest spectrum of products and brands around.

## CALL TOLL FREE 1-800-621-S-A-V-E

(Orders—Membership and advice only)

In Illinois call (312) 260-0002

Your Membership Validation Number A128

You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD, AMERICAN EXPRESS or Diners Club credit cards. Our courteous service consultants are on-line 24 hours Mon-Fri 8:00 AM to 7:00 PM, Sat 9:00 AM to 5:00 PM CST.

PERSONAL COMPUTER NETWORK,  
320 West Ohio  
Chicago, Illinois 60610

Call now...Join the PC NETWORK and start saving today!

## FEATURED PRODUCTS!

### 10MB PC TAPE BACKUP . . . . . \$395.00\*

The same unit as used on COMPAQ's DeskPro!

Configured for internal mounting

### EPSON PRINTERS (Unbelievable Low Prices!!)

LX-80 80 COL/100CPS . . . . . 199.00\*

FX-85 80 COL/160CPS . . . . . 299.00\*

FX-185 132 COL/160CPS . . . . . 429.00\*

LQ-1500 132 COL/200CPS . . . . . 799.00\*

### AMDEK V310A IBM TTL AMBER . . . . . 130.00\*

### AST SIX-PACK™ PLUS w/64K . . . . . 195.00\*

### PC NETWORK SIX-PACK™ CLONE w/64K . . . . . 89.00\*

Ful Six-Pack™ Features—Game Port Standard.

Direct Import from Taiwan at a Fabulous Price!

1 year Warranty—Money back Guarantee

### HAYES 1200B . . . . . 312.00\*

with new Smartcom II/VT100 Emulator

### TALLGRASS TG-5025 . . . . . 2,250.00\*

25MG Hard Disk with 60MG Tape Backup

### IBM LOGO Full Height Drive . . . . . 125.00\*

Genuine IBM DS/DD—Not Equivalents!

### IO MEGA 20MB Bernoulli . . . . . 2,149.00\*

\*Members pay 8% above this wholesale price plus shipping.

Listed below are just a few of the over 30,000 products available at our **EVERYDAY LOW PRICES!**

#### GAMES & EDUCATIONAL SOFTWARE

(Please add \$2.00 shipping and handling for each title ordered from below.)

##### Wholesale

Blowhard Chess (Your Thousandth Game!) \$ 34.95\*

Blowhard Monarchs Of Britain Or Tyricon \$ 34.95\*

Blowhard Monarchs Of France \$ 34.95\*

Blowhard Monarchs Of Italy \$ 34.95\*

Blowhard Monarchs Of Spain \$ 34.95\*

Blowhard Monarchs Of The Americas \$ 34.95\*

Blowhard Monarchs Of The World \$ 34.95\*

# COMPLETE SYSTEMS

(Optional local warranty service available in most major metro areas)

## IBM PC BASE

### SYSTEM

IBM PC w/256K  
Floppy Drive Controller  
2 Double Sided Double Density Disk Drives  
Mix and Match with your Favorite Monitor and Printer



**\$1,425.00\***

CALL FOR LATEST IBM ANNOUNCEMENTS

## IBM PC HARD DISK SYSTEM

IBM PC w/256K  
Floppy Drive Controller  
1 Double Sided Double Density Disk Drive  
Half Height 10MB Disk Subsystem

**\$1,709.00\***

CUSTOM CONFIGURATIONS WELCOME

# COMPAQ™

## PORTABLE HARD DISK SYSTEM

w/256K/1 Floppy/Hard Disk



**\$2,235.00\*** w/10MB  
**\$2,369.00\*** w/20MB

## DESKPRO SYSTEM WITH TAPE BACKUP

640K CPU/1 Floppy/Hard Disk  
10MB Tape Drive/Monitor



**\$2,829.00\*** w/10MB  
**\$2,979.00\*** w/20MB

Wholesale Prices Change Rapidly...if you ever see a lower price advertised anywhere please call! You will find the Network's Price will always be the best!

## 64K IBM PC MEMORY EXPANSION KITS

Quantity Discounts Available.  
Guaranteed for Life!



Set of 9 Chips **\$6.21\***

## DISKETTES

Guaranteed for Life!

Brand name diskettes available in boxes of 10 or in bulk packs of 50

### 1/2 HEIGHT DS/DD DISK DRIVES



**\$59.00\***

Quantity Discounts Available

### INTERNAL PC HARD DISK

Low Power/Automatic Boot Works on standard PC's and Components. Includes drive/controller/cables/mounting hardware and instructions.

Full one year warranty!

10MB

**\$330.00\***

20MB

**\$420.00\***

Quantity Discounts Available



Recent Price Institution by Lotus

**\$285.00\***

**WordPerfect**  
**\$190.00\***  
**MultiMate™**

\*Members pay 8% above this wholesale price plus shipping.  
CALL TOLL FREE 1-800-621-S-A-V-E (orders and membership)

In Illinois call (312) 280-0002 Validation code: A126

Customer Service and Order Status (312) 280-1567

TM & © - Registered trademarks of IBM, COMPAQ, APPLE, AT&T, Novell, LOTUS, Microsoft, VISA, HOMEPAK

# PC NETWORK

## ... WITH THESE 15 UNIQUE BENEFITS

**1 COST + 8% PRICING** — The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

**2 OUR 600 PAGE WHOLESALE CATALOG** — Members receive a 600 page color catalog containing over 30,000 hardware and software products for the IBM PC, Apple and over 50 other popular computer systems. THE NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY. NOW UPDATED QUARTERLY!

**3 IN-STOCK INSURED FAST HOME DELIVERY** — The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVERNIGHT SERVICE IS AVAILABLE ON REQUEST.

**4 10 DAY RETURN POLICY** — If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

**5 MEMBERSHIP SATISFACTION GUARANTEE** — If for any reason you are not satisfied with your membership within 30 days, we will refund your dues in FULL.

**6 EXPERIENCED CONSULTANTS** — The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 man years of personal computer product experience. We back our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED — WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.

**7 FREE TECHNICAL SUPPORT** — The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT — FREE!

**8 OPTIONAL BUSINESS RENTAL LIBRARY** — All members can join our BUSINESS RENTAL LIBRARY featuring over 1000 available titles for just \$25 PER YEAR above the base membership fee. Members can keep their books for up to JUST 20% of the DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 30 DAYS for just \$30 above the V.I.P. base fee. This also includes the game library privileges for a \$5 combination savings.

**9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY** — The Game Rental Library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

**10 SPECIAL SAVINGS BULLETINS** — THE PRINTOUT — Issued Quarterly at no charge to Network members only! The Printout contains all the New Product Listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via THE PRINTOUT.

**11 DISCOUNT BOOK LIBRARY** — Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

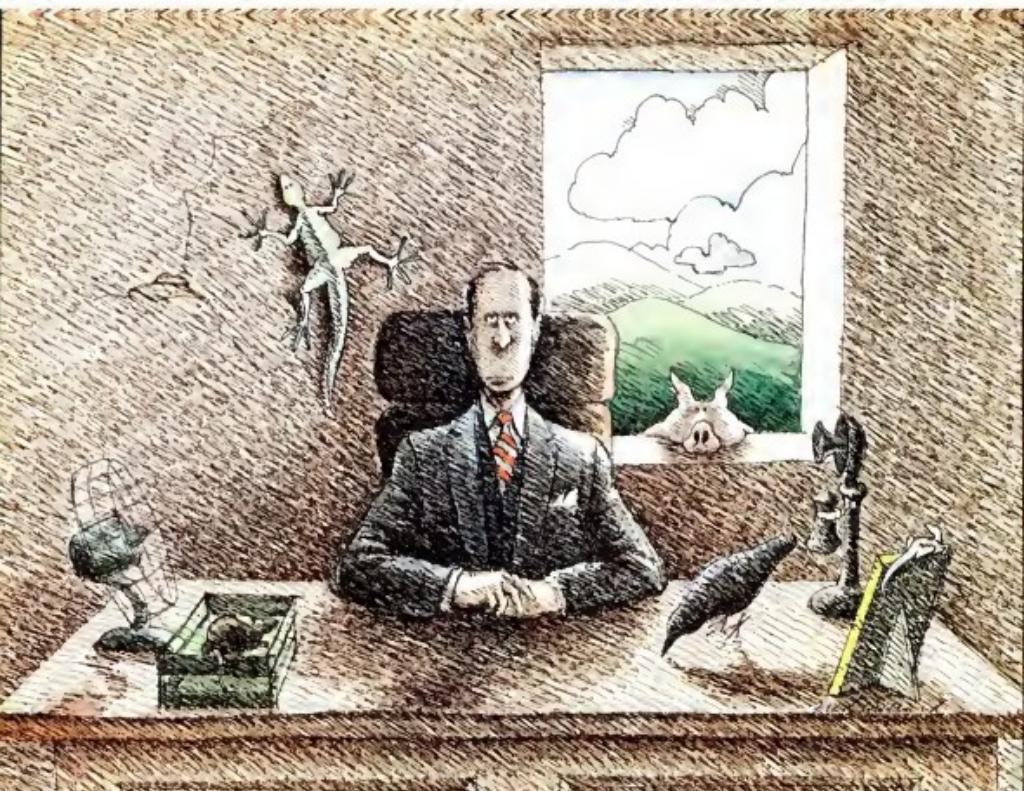
**12 MEMBERSHIP REFERRAL BONUS** — Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchases.

**13 CORPORATE ACCOUNT PROGRAM** — Almost 50% of The NETWORK's sales are to large corporate buyers and resellers (please see page left). The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

**14 QUANTITY DISCOUNTS** — For large corporations, clubs, and repeat or quantity buyers, The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

**15 PRICE PROTECTION** — The PC industry is crazy!! Prices change weekly, monthly or even weekly but often day by day. These changes are sometimes up but are mostly down!! THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!

CIRCLE 215 ON READER SERVICE CARD



*Ed's fortunes changed when he chose a wimpy database that couldn't network.*

Had Ed chosen Network Revelation™ his data, and career, would have been secure. Because Network Revelation is a complete database applications environment that safeguards data by locking at the record level. So two users can't accidentally change the same record at the same time.

There's more. Network Revelation includes an applications generator that automatically writes code in R/BASIC, Rev's powerful programming language. And for the rest of us, there's a versatile report writer with English language queries.

All this is built around a systems approach to database management that has the muscle for even the toughest multi-user applications.

The secret is superior technology.

Variable-length fields save disk space on network servers. Unlimited files, fields and records keep pace with your expanding information needs. Data dictionaries make it easy to change your database when you change your mind. And our high-speed compiler accelerates program execution.

To make upgrading your present single-user application even easier, dBase II™ and Lotus 1-2-3™ conversion utilities are included.

Network Revelation prices start at a mere \$1495. Implementations for IBM's® PC Network, 3Com's™ EtherSeries™, Nestar and Novell NetWare™ are all available now.

Call today to order our \$24.95 Demo/Tutorial (includes free demo

disk) or to schedule a career-altering demonstration of Network Revelation's superior capabilities.

IBM® of International Business Machines, NetWare™ of Novell, Inc., 3Com™ and EtherSeries™ of 3Com Corporation, 1-2-3™ of Lotus Development Corporation, dBase II™ of Ashton Tate.

**COSMOS**™

Cosmos, Inc., 19530 Pacific Highway S., M/S 102, Seattle, WA 98188, (206) 824-9942, Telex: 9103808627

CIRCLE 218 ON READER SERVICE CARD

■ THE NORTON CHRONICLES ■ PETER NORTON

# AN IMPERFECT B&W MONITOR



*Although Norton prefers black-and-white screens that permit black-on-white inverse video, Roland's MB-142 display has too many drawbacks to make him give up green.*

I've always had a fondness for display screens that glow white rather than the ubiquitous green or that European favorite, amber. I'm even more fond of white-phosphor screens that work in inverse video, with black characters on a glowing white background.

Computer screens like that are rare, although Apple's efforts with the Lisa and Macintosh computers have made them more familiar. In the PC arena, no white screens have been available, as far as I know, until recently when the Los Angeles-based Roland introduced its MB-142 character display, designed as a replacement for the IBM monochrome display. When I found out about the display, I was keen to try one.

The idea behind Roland's display is a good one, and the display has a number of nifty features. For example, the display allows you to switch between normal mode (white-lit characters on a black background) and inverse mode (black characters on a white-lit background). The ability to switch between normal and inverse characters is nice just as a matter of preference, whether momentary or permanent.

The color of Roland's display, white with slightly bluish-gray overtones, is pleasant to look at. It fades out in an orange-brown color that's surprisingly nice, too. Everyone I showed the screen to, including my wife, remarked favorably on the interesting color of the screen as it faded out. While a noticeable lag in the time it takes for screen images to fade would seem to be an obvious drawback, people actually appreciate it.

In addition, there's almost no noticeable flicker across the screen in inverse mode. This lack of flicker becomes very important when you're working on a screen with a lit background. If the background on a screen flickers, even subtly, you're almost certain to be in for eyestrain and headaches during a full day's work.

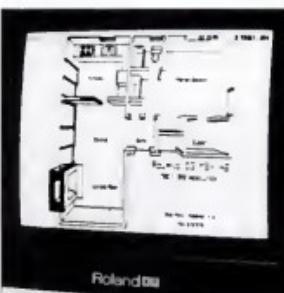
**A HARD TIME ADJUSTING** One of the biggest problems with the Roland Monitor is that unlike the IBM monochrome display, the Roland has an adjustment for horizontal position that will slide the information on the screen to the left or the right. If this adjustment is off, you can lose one or two characters of information from each line on either side of the screen.

Normally this left-right adjustment wouldn't be any problem, but with the Hercules Graphics card, the character mode was shifted to the left and the graph-

ics mode to the right by a significant amount—about as much as the screen could adjust, from the extreme on one side to the extreme on the other.

If, like me, you switch among a variety of programs, some of which take advantage of the Hercules graphics mode and some of which don't, this shifting becomes a real problem. You shouldn't have to adjust your screen for each program you run. But that requirement would be tolerable if the adjustment knob were conveniently located on the front of the monitor. It isn't. The designers of the monitor have assumed that you don't need to fiddle with it all the time. Moreover, this screen-alignment problem has nothing to do with the inverse mode; it applies whether you're in normal or inverse mode.

However, for the majority of PC users who just have the standard monochrome adapter and don't get into graphics, adjusting the monitor is no problem at all, since you'll only need to adjust the knob once. But for any of you who benefit from Hercules graphics (or from any other monochrome graphics adapter, such as IBM's Enhanced Graphics Adapter), this flaw makes the Roland white-screen display a real nuisance. To me it's a severe enough problem to rule out the Roland screen for anyone with a monochrome graphics card.



*Inverse mode on Roland's MB-142 monitor.*

# We can help you capture images that captivate the imagination.



## With TV-quality images far beyond conventional PC graphics.

AT&T Truevision™ high color-resolution graphics can help you capture images that captivate the imagination. Because now you can capture, create, store, display, manipulate, and transmit TV-quality images on AT&T, IBM, and plug-compatible PCs. And you can build Truevision color clarity, and intensity into your graphics with dramatic results. At realistic prices.

The Truevision Image Capture Board (ICB) and Truevision Advanced Raster Graphics Adapters (TARGA) can capture, digitize, and display electronic photographs from any standard

video source such as a video camera, VCR, or video disc player. And they can be used with analog RGB monitors and composite color video monitors. The Truevision Video Display Adapter with Digital Enhancement (VDA/D), our display-only graphics board, can even be used with digital RGB monitors, such as the IBM Color Display and the Sears Total Video System. The ICB and VDA/D provide up to 256 x 240 pixel resolution. The Targa models provide up to 512 x 480 pixel resolution at different pixel depths.

**And the software you need to put the images to work.**

Truevision Image Processing

Software and Image Paint Software let you modify, enhance, merge, and manipulate images that you've captured or created, in real time. To make it easy to draw lines. To change colors. To overlay text and graphics. To air-brush, re-touch, and re-design. And Truevision PC Carousel Presentation Software makes it easy to use your images and your PC to develop and operate sophisticated electronic slide shows.

Truevision high color-resolution graphics can transform business and consumer marketing. Open up new possibilities in computer-aided instruction. Improve productivity in graphic design, broadcasting, video production, and publishing. And revolutionize

communications. Images can be sent over ordinary phone lines in as few as 15 seconds at 1200 baud. And suddenly electronic mail includes electronic photographs. On-line databases deliver digitized images. And still-frame teleconferencing becomes feasible and affordable.

We can help you capture images that captivate the imagination, in hundreds of applications. So call. We'll help you put Truevision into your vision.

For additional information, or to place an order, write or call: AT&T, Electronic Photography and Imaging Center, 2002 Wesleyelley Boulevard, Indianapolis, Indiana 46219.

**1-800-858-TRUE.**



The right choice.

Suggested retail prices: ICB \$1,295, VDA/D \$695, TARGA \$2,295-\$4,895. Truevision is a trademark of AT&T. IBM is a registered trademark of International Business Machines Corporation. Sears is a registered trademark of Sears, Roebuck & Company. Truevision design and development by JWH/CAARAKSGKANWCCCC@BBPJKSJSSJAW © 1985 AT&T

CIRCLE 523 ON READER SERVICE CARD

## ■ THE NORTON CHRONICLES

verse, you need the white background to extend beyond the working edges of the screen, into what's called the overscan area. Much to my disappointment, the Roland's overscan is almost nonexistent. If you're looking at information at the edge of the screen, you're staring at a black edge that's hard on the eyes. This lack of a border is as unpleasant and as unprofessional-looking as a typed sheet of paper with no margins around the edges.

It's also worth mentioning some curious side effects of the inverse-video mode. On the minus side, there's no bright screen attribute in inverse mode; when programs set characters to show bright on the screen, you can't distinguish them in inverse mode (but a push of the button, switching back to normal mode, reveals the brights). When the bright screen attribute indicates vital information (rather than just being a frill), the inverse mode is a real drawback. On the other hand, the "bold" display looks wonderful in reverse video and works even

land display, such as the fact that you can't crank the screen up very bright. But I won't go into all of them now.

### FINE-TUNING

When playing around

with the Roland monitor, I was struck by the remarkable subtlety of the art of fine-tuning a program's display—even though it's a lesson that I've learned several times over as a PC software developer. If you've

**Instead of this...**

**...you can have this**

**with this!**

**\*\$14.95**

Why waste time digging through cumbersome manuals for operating commands? PC-DocuMate™ templates put computer commands at your fingertips for the IBM® PC, PC-XT, PC-AT, AT&T®, Compaq® and Apple® IIe.

You'll have quick reference for needed commands, options and formats right on your keyboard with a PC-DocuMate template.

Our professionally designed, two-sided templates are made of durable, non-glare plastic. Satisfaction is guaranteed—fully—or your money back.

Templates Now Available—  
IBM PC/XT™ and COMPAQ®:  
DOS/BASIC (3.0 & 3.1) • 1-2-3 •  
Symphony • dBASE II & dBASE III •  
Framework • MultiMate •  
WordStar® • WordPerfect® 2000 •  
AppleTalk II • MULTICAN •  
DiskTec 5000 • SUPER CALC® •  
TURBO Pascal • WordPerfect •  
VOLKSWRITER DELUXE •  
Do-It-Yourself.

AT&T®: dBASE III • 1-2-3 •  
WordStar 2000 • WordPerfect  
MultiMate • Do-It-Yourself.  
Apple IIe: AppleWriter II •  
WordStar • VisiCalc • dBASE II •  
QuickFile • Do-It-Yourself.

How to Order:  
To order by credit card call toll free

**1-800-762-7874**

(In NC, call 919-878-3600)  
Or mail to your nearest:  
BankAmericard or MasterCard/Visa/  
American Express information.

NC residents include 4.5% sales  
tax. Add shipping and handling for shipping  
and handling per order. Foreign  
orders, except Canada, add \$15.00  
per order. US funds only. No CODs.

**Our Guarantee:** Use your template  
for 20 days. If you are not completely  
satisfied return it for a full refund.



Systems Management Associates  
3325 Executive Drive, Dept. B-12  
Raleigh, North Carolina 27609

Please send (Quantity and format) \_\_\_\_\_ templates to: \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

MasterCard Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

American Express \_\_\_\_\_

Visa Signature \_\_\_\_\_



CIRCLE 165 ON READER SERVICE CARD

# WE'RE NOT LIKE OUR COMPETITION

- **YOU LIKE IT, OR WE TAKE IT BACK!** If for any reason, you are not satisfied with any product you purchase, you may return it within 10 days of receipt for replacement, credit or a full refund.\*
- **WE'LL PAY YOU IF YOU FIND A LOWER PRICE!** If you find a lower price in this issue before you buy, from any source that can deliver the identical product, we'll beat it! If you buy any item from us at pricing in this ad and find a lower price from any source that can deliver the identical product, we'll not only refund the difference you paid, but also pay you 20% of the difference for your trouble!
- **GUARANTEED AVAILABILITY!** Any item you order will be shipped within Two working days (normally 12 hours) or you will be given a firm ship date when you order! If for any reason we cannot ship by the date you are given, we will deduct 5% from the price of the products shipped late and credit your order accordingly.

## FREE DIGITAL WATCH

With the purchase of any disk drive in this issue, we'll include a 7 melody alarm, Quartz chronograph, digital watch...absolutely FREE! (limit one per customer!)



## BORLAND BLOW OUT!

- SIDEKICK 1.5 c/p . . . . . \$27.75
- SIDEKICK 1.5 nc/p . . . . . \$42.99
- SIDEKICK MAC nc/p . . . . . \$42.99
- TURBO PASCAL 3.0 nc/p . . . . . \$35.33
- SUPERKEY 1.1 nc/p . . . . . \$35.33

## NEW!

- TRAVELING SIDEKICK nc/p . . . . . \$39.97
- TURBO LIGHTNING nc/p . . . . . \$55.00
- REFLEX nc/p . . . . . \$55.00

## COMPONENTS

Quality Japanese mfg. from companies like HITACHI, TOSHIBA and FUJITSU.

- **256K DRAMS** \$26.46  
Set of 8 150ns
- **64K DRAMS** \$7.56  
Set of 8 150ns
- 8087-3 . . . . . \$99.00
- 8087-2 . . . . . \$129.60
- 80287 . . . . . \$178.00
- 27128 . . . . . \$2.90
- 70128 replaces 6068 . . . . . \$14.75
- 27256 . . . . . \$4.50
- 2764 . . . . . \$1.98
- 4128 . . . . . \$2.97

## NOVATION SMARTCAT PLUS

Auto answer/Auto dial 1200 & 0-300 bps. Hayes™ (AT) compatible. Includes MITE™ communication software.

Internal or external model . . . . . \$308.25

## ACCESSORIES

### KEYBOARDS

FULLY IBM™ and KEYTRONICS™ COMPATIBLE

- 5150 style . . . . . \$78
- 5151 style . . . . . \$98
- REPLACEMENT HARD DISK DRIVES**
- 13MB 1/2 Ht. \$198.00
- 25MB 1/2 Ht. \$142.99
- 36MB Full Ht. Seagate voice cell . . . . . \$183.00
- 61MB Full Ht. voice cell . . . . . \$194.00

### BOARD PRODUCTS

- Western Digital 10MB Type II hard floppy card \$129.00
- MULTITECH - DOS/PC board \$145.85
- MULTITECH 4 drive PC floppy controller \$158.00
- MULTITECH multi-board (AST speech comp.) \$118.45
- MULTITECH 10MB Type II hard floppy card \$129.00
- AST Advantage 128K \$384.00
- MULTITECH 16 board \$198.87
- HERCULES's color board \$154.00
- HERCULES's 16 color board \$197.00
- QUADRAM QD8080 16M x 64K \$197.00
- MULTITECH 384K mem exp board (empty) \$168.00

### MODEMS

- SMARTTEAM 103212A Hayes™ serial \$184.00
- TAXAN 2-400 modems \$149.00
- MULTITECH 16 board with MS DOS or Macintosh software \$154.00
- HAYES 1200B w/Smartcom II \$149.00

### MONITORS

- TAXAN 400 medium resolution RGB \$125.00
- AMDEX 300G 12" Green \$119.95
- AMDEX 300G 12" Color/Multicolor Amber \$119.95
- TATTUNG 14" Hi Resolution RGB color \$144.50

### PC POWER SUPPLIES

- 150 WATT \$198.00

## FLOPPY DRIVES PC COMPATIBLE

- PANASONIC 1/2 Ht. . . . . \$88

- APPLE II Compatible, inc. cable . . . . . \$97.75

## HARD DRIVES

### COMPLETE INTERNAL SYSTEMS

Includes drive, controller card, cables and install procedures. Capacities listed are unformated. We sell only the finest drives from Seagate, Mitsubishi, and others guaranteed to meet or exceed original manufacturer's specifications.

- **13MB** 1/2 Ht. . . . . \$369
- **25MB** 1/2 Ht. . . . . \$469
- **38MB** Full Ht. SEAGATE Voice Cell . . . . . \$899
- **51MB** Full Ht. SEAGATE Voice Cell . . . . . \$1098

## FUJI DISK EXPLOSION

Certified Quality 5 1/4" Bulk Disks manufactured by FUJI. Available in your choice of packaging.

In Perfect Data™ Olai-N File box.

With sleeves, labels and wip tabs. Priced per box of 10.

TYPE	1-19	20-29	100-499	500-999	1000+
5/4"0	10.75	9.97	8.57	9.23	10.00
5/4"0	13.50	12.67	11.97	11.45	10.99

### In White Box

With sleeves, labels and wip tabs. Priced per box of 10.

TYPE	1-19	20-99	100-499	500-999	1000+
5/4"0	10.99	10.37	9.97	9.60	9.26

D5/DD Bulk w/o box, sleeves, labels or wip tabs

Price each, in increments of 50 only, poly bagged

50	100-450	500-950	1000-4950	5000+
.96	.89	.84	.80	.77

Inside  
California

► **1-800-358-8881** | **1-800-826-3736** ◀

Outstate  
California

## \* THE FINE PRINT!

If quoting "lowest price" prior authorization required. All items returned must be in original condition with carton, packing and all parts included. Acceptable Money Orders, Certified and Cashier Checks (less per check checks, bank fees, etc.). No returns on software shipped (unless damaged). VISA and MasterCard will not be accepted and American Express will be accepted only if the card has been issued and subject to prior approval at time of publication. All products shipped UPS ground unless specified other wise. All normal manufacturer's warranties apply.

## WORLDWIDE ACCESS

Everybody hates us but our customers.

6311-L DeSoto, WOODLAND HILLS, CA 91367

HOURS 8:30 AM-5:30 PM PACIFIC TIME, MONDAY-FRIDAY

## \* IF YOU DON'T SEE IT, CALL!

We have virtually any product available at the best price. Please let us know what you're looking for and we'll get it for you!

## ■ THE NORTON CHRONICLES

ever developed and then really polished a program for the PC, you've spent time working out the fine points of making the information you display look its best. That process involves figuring out the best way to use the display screen's facilities so as to get the most out of color choices, flashing characters, bright and inverse-video characters, and so forth. You must restrain yourself, too, and take care not to overuse fancy display features.

We tend to think that the use of display attributes might be pretty much the same in any program, but they're not. You need

■ As much as I'd love to work with white, especially inverse white, the problems with the Roland monitor are just too great for me—though they might not be for you.

only take a few programs that really use the screen well and try them in inverse, or black-on-white, mode to see the difference for yourself. I found, when trying this, that lots of programs I thought were great in normal mode didn't look so sharp in inverse. Things aren't just reversed in inverse mode—they're changed in subtle ways. And if a programmer were optimizing a program for inverse mode, he or she would have to make different choices about how screen attributes were used.

You just don't appreciate the subtle programming required to perfect the appearance of a program until you try looking at it on a different kind of screen—like Roland's inverse mode screen.

**STILL STUCK ON IBM** I rather like the Roland white screen with its inverse mode, and I've been trying to convince myself that I like it even more by using it to write this column. But when I finish, I think I'll switch back to my trusty old IBM mono-

chrome monitor. As much as I'd love to work with white, especially inverse white, the problems with the Roland monitor are just too great for me—though they might not be for you. I've tried lots and lots of

other monitors besides this white screen, including some amber screens and many other colors. And I'm still stuck on the IBM monochrome, enhanced by a quarter-polarized glare filter. ■

## Finally!! A tax program worth having . . .



Personal Version 1986, 3.0

### Check These Features!!

- ✓ FAST — 3 seconds for complete return (No Kidding!)
- ✓ Easy to use—windows, pop-up menus
- ✓ "Very easy to use . . . Documentation—Excellent!" —PC Magazine
- ✓ Over 30 forms
- ✓ Built-in tax planning module, includes 1986 tax rates
- ✓ Full depreciation support
- ✓ IRS approved
- ✓ Automatic supporting schedules
- ✓ Our quick-look tax window
- ✓ Override any calculation
- ✓ Rapid changes from form to form
- ✓ Record keeping
- ✓ Terrible display in color or monochrome
- ✓ Operates like a spreadsheet—only easier!!
- ✓ 4-function calculator mode built-in
- ✓ Prints entire return with your personal printer
- ✓ Simply the best at any price!

Only \$65

365 • \$5 shipping handling. Calif residents add 6% sales tax. VISA/MC accepted. Integrated state returns available for many states—Only \$30

### TAX PREPARERS:

Ask about our new professional package, TurboTax ProSeries™. With ProSeries™ you can dramatically reduce client letter time and billing built-in client database, integrated state returns, professional interview sheets, and much more. List Price \$495. Introductory Offer

\$195

### The Critic's Choice!

"Flexible, affordable and complete"—PC Magazine  
"...you'll find this fast, powerful and complete"—  
Steve Rosenthal, Bay Area Computer Currents  
"It makes doing your taxes almost fun . . . With TurboTax you  
can cut the amount of time you spend working on taxes  
down by 70 or 80 percent." . . . recalculating everything is  
so quick you can do it as often as you like."—Bil Alveraz,  
PC Magazine

See your dealer or order direct

**ChipSoft**, Inc., 5674 Honors, San Diego, CA 92122 (619) 453-8722  
TurboTax requires IBM PC, XT, AT or compatible, DOS 2.0 or greater, 250K

CIRCLE 121 ON READER SERVICE CARD

# MICRO CAP and MICRO LOGIC put your engineers on line... not in line.



MY OWN WORKSTATION



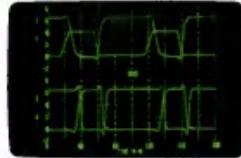
How many long unproductive hours have you spent "in line" for your simulation? Well, no more. MICROCAP and MICROLOGIC can put you on line by turning your PC into a productive and cost-effective engineering workstation.

Both of these sophisticated engineering tools provide you with quick and efficient solutions to your simulation problems. And here's how.

## MICROCAP: Your Analog Solution

MICROCAP is an interactive analog circuit drawing and simulation system. It allows you to sketch a circuit diagram right on the CRT screen, then run an AC, DC, or Transient analysis. While providing you with libraries for defined models of bipolar and MOS devices, Opamps, transformers, diodes, and much more, MICROCAP also includes features not even found in SPICE.

MICROCAP II lets you be even more productive. As an advanced version, it employs sparse matrix techniques for faster simulation speed and larger net-

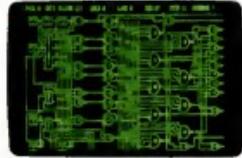


"Typical MICROCAP Transient Analysis"

works. In addition, you get even more advanced device models, worst case capabilities, temperature stepping, Fourier analysis, and macro capability.

## MICROLOGIC: Your Digital Solution

MICROLOGIC provides you with a similar interactive drawing and analysis environment for digital work. Using standard PC hardware, you can create logic diagrams of up to 9 pages with each containing up to 200 gates. The system automatically creates the netlist required for a timing simulation and will handle networks of up to 1800 gates. It provides you with libraries for 36 user-defined basic gate types, 36 data channels of 256 bits each, 10 user-defined clock waveforms, and up to 50 macros in each network. MICROLOGIC produces high-resolution timing diagrams showing selected waveforms and associated delays, glitches, and spikes—just like the real thing.



"Typical MICROLOGIC Diagram"

## Reviewers Love These Solutions

Regarding MICROCAP... "A highly recommended analog design program" (PC Tech Journal 3/84). "A valuable tool for circuit designers" (Personal Software Magazine 11/83).

Regarding MICROLOGIC... "An efficient design system that does what it is supposed to do at a reasonable price" (Byte 4/84).

MICROCAP and MICROLOGIC are available for the Apple II (64k), IBM PC (128k), and HP-150 computers and priced at \$475 and \$450 respectively. Demo versions are available for \$75.

MICROCAP is available for the Macintosh, IBM PC (256k), and HP-150 systems and is priced at \$895. Demo versions are available for \$100.

Demo prices are credited to the purchase price of the actual system.

Now, to get on line, call or write today!

**Spectrum Software**

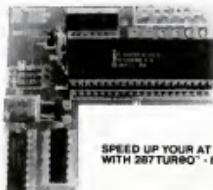
1021 S. Wolfe Road, Dept. F  
Sunnyvale, CA 94087  
(408) 738-4387

# MICROWAY'S 8087 RUNS 1-2-3™!

MicroWay is the world's leading retailer of 8087's and high performance PC upgrades. We stock a complete selection of 8087's that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - one year! We also offer daughterboards for socketless computers such as the NEC PC, and a board which increases the clock speed of the 80287 from 4 to 8 mhz. Our NUMBER SMASHER™ includes 512K ram. It will run the IBM PC at clock speeds up to 10mhz and achieves a throughput of .1 megaflops with

87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software and 8087 expertise as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available. For information call us at

**617-746-7341**



SPEED UP YOUR AT  
WITH 287TURBO™ 8mhz

## Micro Way® 8087 Support

### For the IBM PC, PC XT, PC AT and Compatibles.

**NUMBER SMASHER™** The Worlds Fastest Arithmetic Card for the IBM PC XT and Compatibles! Includes an 8086 and 8087 pair tested to 10mhz, and 512K bytes of high speed ram. Compatible with all software, operating systems and hardware! Your program speed is increased by a factor of 2.5 to 4.0. Floating point programs run up to 2.8 times faster on the PC than on an 80287 equipped PC AT..... \$1049

**MATRIXPAK™** manages a MEGABYTE! Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.3, MS Assembler, and 87BASIC/INLINE..... each \$99

**87FFT™** Written in assembly language, performs Fourier Transform FFTs on complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from MS Fortran, 87MACRO, C, TURBO PASCAL or 87BASIC/INLINE..... \$200

**87FFT-2™** performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT \$100

**GRAPHICS PACKAGES**  
Grafmatic for Fortran or Pascal..... \$125  
Plotmatic for Grafmatic..... \$125  
MultiHatch (one language)..... \$189

**DFixer™** - A disk utility which thoroughly checks PC or AT hard disks for bad sectors and updates the MS-DOS file allocation table accordingly..... \$149

**A2D-160™** - MicroWay's Data Acquisition Board performs 160,000 12 bit Analog to Digital conversions per second! Includes software drivers. The fastest 12 bit A to D board available. For the IBM PC or XT..... \$1295

**87BASIC/INLINE™** converts the output of the IBM Basic Compiler into conforming 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC..... \$200

**87BASIC™** includes patches to the IBM Basic or MS Quick Basic Compiler for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendentals, addition, subtraction, multiplication, and division..... each \$150

**87MACRO/DEBUG™** - contains all the pieces needed for writing 8087/80287 callable code including 8087 macros, object libraries for commonly used functions, including transcendental, trigonometrics and conversions between strings and real numbers. Our 87DEBUG completes the package..... \$199

**OBJ-ASM™** - a multipass object module translator and disassembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for patching object modules for which source is not available..... \$200

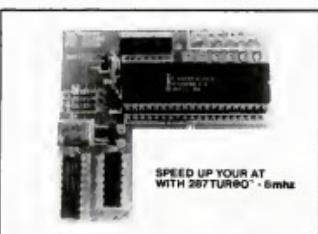
**RTOS - REAL TIME OPERATING SYSTEM**  
RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's RMX-86, LINX-86, LOC-86, LIB-86, CH-86, and MicroWay's 87DEBUG. Runs on the IBM-PC, XT, PC-AT and COMPAT. .... \$400

**INTEL COMPILERS**  
FORTRAN-86..... \$750  
PASCAL-86..... \$750  
PL/I-86..... \$850  
ASM-86..... \$200

All MicroWay product names are trademarks of MicroWay Inc. Manufacturer product names are trademarks of individual manufacturers.

**FASTBREAK™** employs the 8087 to increase the speed of Lotus 1-2-3™ Version 1A or 1A\* by up to 36 to 1... \$79  
**FASTPAK™** Includes FASTBREAK software and a 5mhz 8087 ..... \$179  
**87SFL™** - MicroWay's Scientific Function Library contains 170 scientific and engineering functions ranging from simple trigonometrics to Kelvin, Airy, Ellipticals, Integrals, Bessel, Weierstrass, Polynomials and Probabilities. It is callable from most 8087 compatible compilers.

First Language..... \$250  
Additional Languages..... each \$100



### For the IBM PC, PC XT, PC AT and Compatibles.

**8087 5mhz**..... \$109  
Including DIAGNOSTICS and one-year warranty  
For IBM PC and compatibles.

**8087-3 5mhz**..... \$175  
For the Tandy 1200.

**8087-2 8mhz**..... \$175  
For Wang, AT&T, DeskPro, NEC, Leading Edge.

**80287-3 5mhz**..... \$199  
For the IBM PC AT and Compaq DeskPro 286.

**80287-8 8mhz**..... \$295  
For 8mhz sockets.

**287Turbo™ 8 mhz**..... \$395  
With Reset and Diagnostics for IBM PC AT.

**88Turbo™**..... \$195  
For the IBM PC and XT.

**64K RAM Set 150ns**..... \$9  
**256K RAM Set 150ns**..... \$29

**256K RAM Set 120ns**..... \$39

**128K RAM Set PC AT**..... \$89

**JRAM, MAYNARD, AST**..... CALL

### COMPILERS and UTILITIES

Microsoft Fortran Version 3.31..... \$209

IBM Professional Fortran..... \$465

Ryan-McFarland Fortran..... \$399

FORLIB+ or STRINGS and THINGS..... \$65

Latice C..... \$269

Microsoft C..... \$299

FLOAT87..... \$150

IBM Basic Compiler Version 2.0..... \$465

Microsoft Quick Basic..... \$89

Simone's BetterBASIC..... \$175

True BASIC..... \$105

IBM Assembler with Librarian V.2.0..... \$55

Microsoft Assembler Version 3.01..... \$99

Microsoft Pascal Version 3.31..... \$199

Borland Turbo with 8087 Support..... \$85

STSC APL+PLUS/PC..... \$450

STATGRAPHICS..... \$595

COSMOS Revelation..... \$750

Phoenix Printk86..... \$295

SPSS/PC+..... \$595

SPSS ADVANCED STATISTICS..... \$275

SPSS TABLES..... \$275

EDISON Text Editor..... \$195

LABTECH NOTEBOOK..... CALL

European Customers: Please call MicroWay in London at 01-223-7662.

**Micro  
Way**

P.O. Box 79  
Kingston, Mass.  
02364 USA  
(617) 746-7341

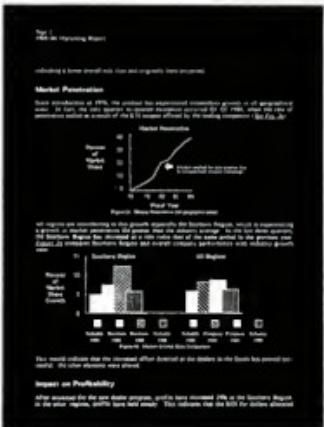
**The World Leader  
in 8087 Support!**

The impressions you make on paper are frequently the keys to future opportunities. Your first letter or an important proposal are the basis by which others are impressed by you. Polaris Software offers three printing programs which will make your impressions great *impressions*.

The first impression is the package in which your document is delivered. Polaris Labelmaker prints striking labels and envelopes. The document itself is printed with Polaris PrintMerge which prints each page *camera ready* as if it were typeset. And finally, forms for all purposes are printed with Polaris Forms in an easy and cost effective way. What better way to make a great impression?

# HOW TO MAKE A GREAT IMPRESSION WITH POLARIS

And the Hewlett Packard LaserJet Printers



## Polaris PrintMerge . . .

\$124.00

The print program Hewlett Packard uses to make a great impression with the LaserJet. Use all the powerful features of the LaserJet and WordStar together. Add the enhancements by Polaris PrintMerge and nothing can print better looking reports, presentations, documentation, or correspondence. Each is printed to typeset perfection. Graphs are merged from Microsoft Chart and Chart-Master.

## Polaris Labelmaker . . .

\$124.00

Labels for all purposes printed effortlessly. Envelopes, too. Labels and envelopes are created with any word processing program. They are printed with all the special print fonts and quality of the LaserJet, including bar codes. Merge the printed data from any data base or enter it through the keyboard.

## Polaris Forms . . .

\$149.00

Professionally printed forms in minutes. Easily designed forms printed to perfection. Store the forms in the LaserJet PLUS for use by other programs. Print just the form or merge data from other programs. Special commands to design forms quickly using proportional fonts, right justified text and all features of the LaserJet.

*Let Polaris Software help you make a great impression.*



Of Course, A 30 Day Money Back Guarantee.

(\$6.00 Shipping. 6% tax in Ca.)

For Orders Call:

In California

800 231-3531

Outside California

800 338-5943

310 Via Vera Cruz, Suite 205 • San Marcos, Ca. 92069 • 619 471-0922

Runs on IBM-PC, XT, AT or 100% compatibles with 196K RAM and the HP 150 with 384K RAM

Registered Trademarks: LaserJet, LaserJet Plus, HP 150, Hewlett-Packard Co., Western Microcomputer International Corp., IBM PC, XT & AT, IBM Corp., Microsoft Chart, Microsoft Corp., Chart-Master, Decisions Resources, Polaris PrintMerge, Polaris Labelmaker & Polaris Forms, Polaris Software.

CIRCLE 378 ON READER SERVICE CARD

# THE PROFESSIONAL'S CHOICE

**NEW**  
Lotus  
1-2-3  
**\$319**

**NEW**  
Lotus  
Symphony  
**\$439**

dBase III  
**\$369**

**NEW**  
FrameWork  
II  
**\$369**

MultiMate  
**\$219**

**NEW**  
Word  
Perfect 4-1  
**\$209**

## Software

### Word Processing Editors

FAIR FORT	\$110
FINAL WORD	\$110
MICROSOFT WORD	\$110
MULTIMATE	\$110
MULTIPAGE	\$110
ADVANTAGE	\$110
OFFICE WRITER/	\$120
GRAPHWRITER	\$120
COMBO	\$120
IMAGINATION	\$120
SANIMA WORD III	\$120
YOUNGWRITER	\$120
DETAILED	\$150
VOLKSWRITER	\$150
SCIENTIFIC	\$150
WORDSTAR 4.1	\$150
WORDSTAR	\$150
WORDSTAR 2000	\$150
WORDSTAR 2000+	\$150
WORDSTAR PRO	\$150
XYWRITE II*	\$150

### Business Systems

ALPHA DATA BASE	
MANAGER II	\$175
CLIPPER	\$195
CLOUD V 2.5	\$195
CONDOR II	\$195
CORNERSTONE	\$195
DISASSEMBLER	\$195
KNOWLEDGE MAN 2	\$195
PARADOX	\$195
PC FOCUS	\$195
PF REPORTER	\$195
REPORT	\$195
POWERBASE	\$195
QUICKREPORT II	\$195
R BASE 5000	\$195
REFLEX	\$195
REVELATION	\$195

### Spreadsheets/

Integrated Packages	
ELITE DESK	\$200
ENABLE	\$200
FRAMEWORK II	\$200
JAZZ	\$200
LOTUS 1-2-3	\$215
MULTIPLAN	\$215
OPEN ACCESS	\$215
SPREADSHEET	\$215
AUDITOR	\$215
SUPERCALC 2	\$215
SYMPHONY	\$215

Helcules  
Graphics Card  
**\$299**

Mountain  
Drivecard 10  
**\$789**

Quadboard  
384K  
**\$219**

Six Pak Plus  
384K  
**\$249**

Smartmodem  
1200B  
**\$349**

Smartmodem  
2400  
**\$579**

\*CALL FOR SHIPPING COSTS



## LOWEST PRICE GUARANTEE!!

We will match current nationally advertised prices on most products. Call and compare.

**1-800-221-1260**

In New York State call (718) 438-6057

*free!*  
Diskette  
Library  
Case  
with your order



### TERMS

Checks—allow 14 days to clear. Credit processing—add 3%. COD orders—cash M.O. or certified check—add \$5.00. Shipping and handling UPS surface—add \$3.00 per item (UPS Plus \$6.00 per item). NY State Residents—add applicable sales tax. All prices subject to change.



MON.-THURS. 9:00AM-8:00PM  
SUN. & FRI. 9:00AM-4:00PM

**Softline**  
Softline Corporation  
P.O. Box 729, Brooklyn, N.Y. 11230  
TELEX: 421047 ATLN U  
FAX: 718-972-8346

# Arlington Computer Products gives you the best prices on IBM PCs...

## IBM PC

2 Drives, 256K, Monochrome Monitor	<b>\$1925</b>
2 Drives, 256K, Color Monitor	<b>\$2099</b>
2 Drives, 256K, 10 MB Hard Disk, Monochrome Monitor	<b>\$2349</b>

## IBM XT

1 Drive, 256K, 10 MB Hard Disk, Monochrome Monitor	<b>\$2549</b>
1 Drive, 256K, 10 MB Hard Disk, Color Monitor	<b>\$2695</b>
1 Drive, 256K, 20 MB Hard Disk, Monochrome Monitor	<b>\$2575</b>

## IBM AT

Unenhanced  
**\$3095**

1.2 Floppy  
512K, 20 MB Hard Disk,  
Monochrome Monitor  
**\$3995**

COMPAQ PORTABLE, 2 Drives, 640K, Clock... **\$2125** 1 Drive, 640K, Clock, 10 MB Hard Disk... **\$2549**

## ...and disk drives too!

IBM .....	\$ .99
TANDON TM100-2 .....	\$ .99
SHUGART SA455 .....	\$ .84
TEAC FD55B .....	\$ .89
360K Drive for AT .....	\$119

## 10 MB HARD DISKS

from **\$429**

20 MB HARD DISKS from **\$499**

## 10 MB TAPE BACK UP

**\$479**

## PERIPHERALS

TAXAN MONOCHROME	\$139
HERCULES GRAPHICS	\$289
HERCULES COLOR CARD	\$145
EVEREX THE EDGE	\$249
STB GRAPHICS PLUS II	\$249
TECMAR GRAPHICS MASTER	\$449
TSENG ULTRA PACK	\$499
TSENG ULTRA RAM	\$199
HAYES 1200 MODEM	\$379
HAYES 2400 MODEM	\$615
EVEREX 300/1200 INT. MODEM w/ software	\$229
US ROBOTICS 2400 MODEM	\$449
ORCHID PC TURBO	\$599
AST ADVANTAGE	\$399
AST 5251-11	\$649
64K RAM CHIPS bank of 9.	\$ 9
256K RAM CHIPS each	\$ 4
128K RAM CHIPS each	\$ 6

## ★ISSUE HIGHLIGHTS★

AST 6 PACK w/64K	AT MULTIFUNCTION w/128K	HAYES 1200 B
	expandable to 3MB	w/ software
<b>\$215</b>	<b>\$239</b>	<b>\$339</b>
QUADBOARD w/64K	EVEREX GRAPHICS EDGE	QUADCOLOR II COLOR MONITOR
<b>\$179</b>	<b>\$259</b>	by Quadram
APPARAT w/64K	EVEREX MINI MAGIC w/384K	<b>\$379</b>
memory & clock	memory only	PRINCETON HX 12
<b>\$109</b>	<b>\$115</b>	includes cable

## PRINTERS

### EPSON

LX 80 .....	\$219
FX 85 .....	\$325
FX 185 .....	\$459
LQ 1500 .....	\$879
Interface for LQ 1500 .....	\$ 75

### OKIDATA

ML 192 .....	\$359
ML 193 .....	\$499
84 IBM .....	\$649

### SILVER-REED

EXP 400 .....	\$249
EXP 500 .....	\$269
EXP 550 .....	\$399
EXP 770 .....	\$699

### TOSHIBA

1340 .....	\$549
351P/S .....	\$1095

### NEC

P2 .....	\$499
P3 .....	\$715
2050 .....	\$639
3550 .....	\$1025

## SOFTWARE

LOTUS 123 .....	\$329
SYMPHONY .....	\$409
WORDSTAR 2000 .....	\$249
WORDSTAR 2000 PLUS .....	\$299
D BASE III .....	\$369
FRAMEWORK .....	\$369
PC MOUSE w/paint brush .....	\$119
HAYES SMARTCOM II .....	\$ 95
CROSSTALK .....	\$109
KEEP TRACK Home Accountant .....	\$ 39

CIRCLE 114 ON READER SERVICE CARD

FOR ORDERS & SYSTEMS QUOTES:

**800-548-5105**

OR  
CALL **800-548-5106**

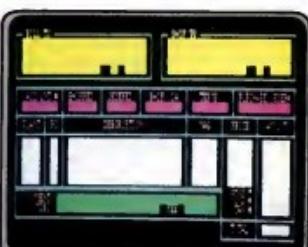
FOR INFORMATION AND IN ILLINOIS CALL 312-228-6333

Prices and Availability Subject To Change Without Notice

**Arlington Computer Products, inc.**  
450 E. HIGGINS ROAD  
ELK GROVE VILLAGE, IL 60007



# Flashy Programs.



**dBASE • Turbo Pascal • BASIC • C • COBOL • Fortran • Lotus 1-2-3...**

## FLASH CODE™

The most powerful program developer for dBASE II and dBASE III ever developed.

**CREATE** any screen design with our advanced screen editor. Use Flash Code and see how incredibly easy screen design can be.

**GENERATE** complete programs automatically. Based on your screen designs, Flash Code can write your **whole** dBASE program.

**FLASH-UP WINDOWS™**. Menus and Help Windows add a new dimension to your dBASE programs. Create them instantly with our window editor. Use the FlashUp™ module to have windows pop-up throughout your dBASE applications.

For dBASE II and dBASE III. \$150.

"...a truly remarkable product. Brand-new, state-of-the-art and actually fun to use. The windows make it an even more amazing product."

Cary N. Prague, Author

"Beyond programming with dBASE III"

"Destined to replace QUICKCODE™"

MicroNews/Views, Nov. 85

## SCREEN SCULPTOR™

You can create screens in minutes...then Screen Sculptor writes the program.

Move pieces of the screen around, select colors from a menu, draw boxes and lines, paint, repeat last character in any direction. And more!

Specify variable names, data types, acceptable date ranges, pictures for edit checking, etc.

Screen Sculptor then generates an actual program source code based on your screen design. Use it as is or modify it.

For BASIC, Turbo Pascal, IBM/Microsoft Pascal. \$125.

"...so well done that you may not need to refer to the manual."

"...an exceptional product that fits a real need in the development of new programs." Computer Language

## **NEW!** **FLASH-UP WINDOWS™**

An incredibly flexible and powerful tool for Flash-Up Menus and Flash-Up Help Windows!

Every program, every application becomes more sophisticated and easier to use with Flash-Up Windows.

Use the window editor to instantly create windows. Change their size, location, color...all automatically. Specify a string of control codes to send back to your application program.

The windows can be flashed-up directly by your program OR by the user with the keyboard. Windows can even call other menus or help windows.

An absolute necessity for BASIC, Turbo Pascal, C, R:BASE, COBOL, Fortran, dBASE, Lotus 1-2-3...

**Introductory price. Only \$75.**  
(Until 3/31/86)

CIRCLE 530 ON READER SERVICE CARD

## No Risk Demo Offer!

Here's a no-risk offer. Order now and you'll also get a full demo disk. Use the demo and the manual for 30 days. If you don't love it, return the package for a full refund.

**Credit card orders call 24 hrs/day  
1(800) 824-7888, operator 268.**

All other orders and inquiries call or write  
Software Bottling Co., 6600 L.I. Expyw,  
Maspeth, NY 11378. 718-458-3700.



Requires an IBM PC, XT, PC AT or true compatible, 256K

# How does WordPerfect top 4.0? Extra credit.

## WordPerfect 4.1 Performance Report

A  
+5 extra  
points

**A** lot of people have been saying a lot of good things about WordPerfect, lately. In fact, our 4.0 version has been called the industry standard for word processing.

Of course, our first reaction was smiles all around (and a celebration or two). Our second reaction? Back to work on WordPerfect. Not because it isn't already a great program. But because the one thing that has made WordPerfect a success is our commitment to constant improvement. Reaching for perfection.

The latest result of that commitment is WordPerfect 4.1. And with several new features, it scores more than a few extra points.

### 1. Thesaurus

With a built-in thesaurus, WordPerfect 4.1 lets you choose synonyms for any words in your document.

### 2. Split Screen

By splitting the screen

horizontally, you can view two documents at the same time. And editing either document or moving text between the two windows is fast and easy.

### 3. Text Columns

Columns are displayed side-by-side on the screen. In addition to newspaper-style columns, WordPerfect 4.1 includes parallel columns, ideal for scripts.

### 4. Line Drawing

Horizontal and vertical lines can be drawn and configured to form boxes or other graphic applications. Many available line styles include single, double and asterisks.

### 5. Sort

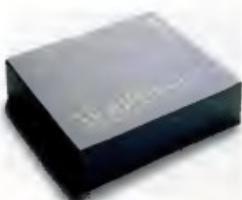
WordPerfect 4.1 allows you to sort lines, paragraphs or merge files alphabetically.

Other new WordPerfect 4.1 features include an expanded spelling dictionary, improved

critical error handling, improved proportional spacing, three-level undelete, type-thru and more.

Learn the finer points of word processing. Get WordPerfect 4.1. For more information, call or write:

SSI Software  
288 West Center Street  
Orem, Utah 84057  
Information: (801) 227-4020  
Order Desk: 1-800-321-4566,  
Toll-free



**SSI**Software  
Reaching for perfection.



"Your Money's Worth"

## WORD PROCESSOR WITH MAIL MERGE for the IBM-PC

### FILE RECOVERY SYSTEM

**\$69.95**

#### YES YOU CAN RECOVER ERASED FILES

Even " " With Brown Bag™ Software's File Recovery System for the IBM-PC and compatibles, no programming experience required. If you can erase a file, you can restore it.

#### MENU-DRIVEN and "FOOL-PROOF..."

Do you have "one-of-those" in your office... we do too! That's precisely why we developed Brown Bag™ Software's File Recovery System for the IBM-PC and compatibles! Our menu-driven system is a snap.

#### FIX A DAMAGED FILE TOO!

Sometimes files can get "glitched," by a power spike, bumping into the hard disk, dropping the computer on the floor, etc. We understand. That's why we've included a full screen editor to repair any spot in any file, hidden or otherwise.

#### IS IT HARD OR FLOPPY?

We don't care. We work with floppy disk, most hard disks, and most IBM-PC compatible computers. And we are not copy protected.

#### HELP IS ONLINE TOO!

We know that most people don't read manuals. (But we include a comprehensive one anyway.) And when you see a file and need it recovered NOW, you're not in any frame of mind to pour through any manual. We understand. That's why we've put handholding online. Just hit the ? key and the help appropriate to where you are and what you want to do is immediately available. The only thing better would be two aspirin!

#### OTHER HANDY TOOLS...HELP: WHERE THE FILE GO?

We provide menu-driven tools to change a file's attributes, change disk labels, modify screen color, locate a lost file that you know is somewhere on the disk, but it's lost in a maze of sub-directories (you forgot which).

To Order: CALL NOW

**408-395-9568**

24 Hours A Day, 7 Days A Week  
Have Your Credit Card Ready

Brown Bag™ Software  
15100 El Camino Grande  
Saratoga, CA 95070

**\$89.95**

Exclusive Publishing Edition

#### WE DO WINDOWS

Brown Bag™ Software's Word Processor for the IBM-PC and compatibles allows you to edit two documents at the same time or edit two parts of the same document at the same time. You can choose the window size of your choice.

#### FREE MAIL MERGE

Brown Bag™ Software's Word Processor for the IBM-PC and compatibles comes with Mail Merge built-in, not an expensive add-on! This allows you to send out "form letters" that insert data, names and addresses from your favorite database.

#### KEYBOARD MACROS INCLUDED

Brown Bag™ Software's Word Processor for the IBM-PC and compatibles includes a built-in Macro Processor. This feature allows you to re-assign almost any key on the keyboard to a more convenient one, or to assign commonly used text, boiler-plate, signature blocks, etc., to a keystroke. Save keystrokes, eliminate errors, increase productivity!

#### POWERFUL EDITING FEATURES

Like right and/or left justification, global search and replace including wildcards, un-replace, undo, block moves, block copy and/or delete, word wrap, temporary and permanent margins, footnotes, headers, trailers (multi-line), mixed right and left pages, page numbering option, on-screen page breaks and more more more!

#### PRINTERS AND FONTS GALORE!

Brown Bag™ Software's Word Processor for the IBM-PC and compatibles includes drivers for 47 types of printers, including the new lasers! Multiple fonts are standard too, including draft printing (high speed) option. Speaking of printing, we can print any document continuously (until you either run out of paper or terminate), a specified number of times or just once.

#### GREAT DOCUMENTATION AND FREE TELEPHONE SUPPORT

Brown Bag™ Software's Word Processor for the IBM-PC and compatibles comes with a 175+ page manual which includes a table of contents, index and tutorial. For those "Techie Types," we've also included a complete technical section. A limited amount of free telephone support is included for registered owners of this package, only. Additional telephone support is available at a time-basis charge. This additional support is charged to Visa or Mastercards. Support is available Monday through Friday, 9 A.M. through 5 P.M. Pacific Time, normal business holidays excluded.

#### COMPATIBILITY

IBM-PC and most compatibles including XT, AT, JR, Compaq, Tandy PC's, Eagle, etc. 128K of memory is preferred. Monochrome display, single color, or multi-color mode, pick your own colors, or use our defaults. 24 editing lines. Use your existing word processor files, too! Requires 1 double-sided floppy disk drive. It runs on hard disks, and will use DOS 2.0 or greater sub-directory commands and path names.



## A FRIEND INDEED.

Face it. Everybody needs somebody sometime. And even the best PC occasionally needs help with faulty power.

So give your hard disc or critical-use system LINE 2® power conditioning. And eliminate those nagging problems that your PC can't prevent. Like voltage sags and surges. Brownouts. Spikes.

LINE 2 Power Conditioners are designed

specifically with your PC in mind. High inrush currents don't affect them. Neither do power problems. And they're amazingly economical.

A LINE 2 Power Conditioner can be your PC's best friend. And a friend in need is a friend indeed. Call us today at (619) 279-0831, or contact your local Square D distributor.

**TOPAZ®**  
SQUARE D COMPANY

CIRCLE 353 ON READER SERVICE CARD

# THE DIRECT BENEFITS OF BUYING SOFTWARE & HARDWARE DIRECT FROM LOGICSOFT.



## FREE OVERNIGHT DELIVERY.

Buy it today . . . use it tomorrow! At Logicsoft, we know you want your new product as fast as possible. That's why only Logicsoft ships your order the same day via Purolator Overnight Courier® . . . at no additional cost to you! You not only save money, you save valuable time, too.

## OUR LOWEST PRICE GUARANTEE.

We're so confident about our low prices that if you can find a lower price we'll beat it by \$10! This offer includes any legitimate advertised price or quote on any of the hundreds of products we stock. And we stock only the latest versions. All factory sealed with the manufacturer's warranty. Our Corporate Accounts Program also offers attractive volume discounts. And we accept purchase orders from qualified institutions. They're two more reasons why Logicsoft has become the major supplier of hardware and software to more than 50,000 companies worldwide, including over 90% of the Fortune 1000.



## TOLL-FREE CUSTOMER SERVICE.

Customer service and technical support is only a toll-free call away before and after the sale. Our customer service representatives can instantly recall your ordering information from our on-line terminals. So they can answer your questions quickly and efficiently. Our technical people are standing by to help answer questions on any product we carry. Logicsoft gives you much more than great prices and fast delivery. We give you peace of mind as well.

\*Applies to order totaling over \$100. Shipped UPS—free if under \$100 (within Cont. U.S.). Due to weight restrictions, systems, printers and monitors are also shipped UPS—free.  
\*\*This offer does not apply to items under \$100, American Express or Terms orders. In these instances, we will meet any lower price.

To order or receive technical assistance, call our National Hotline: **1-800-645-3491** NY State: 516-249-8440  
Circle #400 on reader service card.

Customer Service: 1-800-431-9037

# FREE 90-DAY, ON-SITE SERVICE ON ALL SYSTEMS.

On all systems, Logisoft offers something no other direct distributor does: a free 90-day on-site service contract. We've contracted with SORBUS, a Bell Atlantic Company, to service your system—at your facility—if a problem arises. SORBUS is one of the world's largest and most respected independent computer maintenance firms, servicing over 325,000 computer installations. Wherever you are. Whatever the problem. Expert technical assistance is only a phone call away.

## IBM-PC DELUXE—\$2,229

- 256Kb Ram Memory • Two DSDD 360K Floppy Disk Drives • Half Height 10Mb Internal Hard Disk • Hard Disk Controller • Five Expansion Slots • IBM-PC Keyboard • 90-Day, On-Site Sorbus Service Contract • Color Or Monochrome Monitor Available As Option

## IBM PC/XT—\$2,349

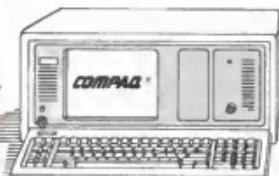
- 256Kb Ram Memory • DSDD 360K Floppy Disk Drive • 10Mb Internal Hard Disk
- Hard Disk Controller • Eight Expansion Slots • IBM PC/XT Keyboard • 90-Day, On-Site Sorbus Service Contract • Color Or Monochrome Monitor Available As Option

## IBM PC/AT ENHANCED—\$3,895

- 512Kb Ram Memory (Exp. to 3Mb) • 12Mb Floppy Disk Drive • 20Mb Internal Hard Disk (Optional 30Mb) • Eight Expansion Slots • Hard Disk Controller • IBM 84 Key AT Keyboard • Optional 20Mb Stream Tape Back-up • 90-Day, On-Site Sorbus Service Contract
- Color Or Monochrome Monitor Available As Option

## COMPAQ PORTABLE HARD DISK SYSTEM—\$2,495

- 256Kb Ram Memory • DSDD 360Kb Floppy Disk Drive
- 10Mb Internal Hard Disk • Hard Disk Controller • 90-Day, On-Site Sorbus Service Contract • 9" Text/Graphics Monitor Included



## COMPAQ PORTABLE 286 MODEL 2—\$4,249

- 640K Ram Memory • 1.2Mb Floppy Disk Drive • 20Mb Internal Hard Disk Drive • 80286 Based CPU
- 9" Text/Graphics Monitor Included • 90-Day, On-Site Sorbus Service Contract

## COMPAQ PORTABLE DUAL DISK SYSTEMS—\$2,239

- 256Kb Ram Memory • Two DSDD 360Kb Floppy Disk Drives • 9" High Resolution Text/Graphics Monitor Included • 90-Day, On-Site Sorbus Service Contract

## COMPAQ DESKPRO—\$2,549

- 8086 Board CPU • 256K Ram Memory • 360K Floppy Disk Drive • 10 Mb Hard Disk • Hard Disk Controller • COMPAQ Dual Mode Monitor • 90-Day, On-Site Sorbus Service Contract

## COMPAQ 286 DESKPRO—\$4,349

- 80286 Based CPU • 640K Ram Memory • 1.2 Ms Floppy Disk Drive
- 20 Mb Hard Disk • Hard Disk Controller • COMPAQ Dual Mode Monitor • 90-Day, On-Site Sorbus Service Contract

IBM MONOCHROME OPTION 1—\$249 Monochrome Graphics Display Card.

AMDEK 310A Monitor Parallel Port.

IBM MONOCHROME OPTION 2—\$349 Monochrome Graphics Display Card. IBM Monochrome Monitor Parallel Port.

IBM COLOR OPTION 1—\$559 Color Graphics Display Card. Princeton RGB HX-12 Monitor Parallel Port.

IBM COLOR OPTION 2—\$659 Color Graphics Card. IBM Color Monitor Parallel Port.

AT&T 6300 SERIES AVAILABLE.



- No surcharge for MasterCard, VISA, American Express, C.O.D., money order or check • P.O.s accepted . . . no surcharge (please call for price verification)
- No sales tax on orders shipped outside N.Y. State • Please add 2% for insurance and handling [Int'l orders add 10%] • All products covered by mfg. warranty
- We do not bill until we ship.

IBM PC™, AT™ and PC/XT™ are trademarks and IBM® is a registered trademark of International Business Machines Corporation. COMPAQ® is a registered trademark of Compaq Computer Corporation.

Circle #400 on reader service card.

# SOFTWARE FOR VIRTUALLY EVERY IBM-PC APPLICATION.

FREE OVERNIGHT DELIVERY. LOWEST PRICE GUARANTEE. TOLL-FREE CUSTOMER SERVICE.

## WORD PROCESSING

Wordstar	\$185	Friday	179	ENERGRAPHICS	\$249	P-Link 86	319
Wordstar 2000	259	pfs: file & pfs: report	165	PC Draw	219		
<b>WORDSTAR 2000 PLUS</b>	<b>305</b>	<b>REVELATION</b>	<b>715</b>	Gem Draw (incl. Desk Top)	95		
Wordstar Pro Pac	255	Revelation Network (1-4)	1195				
<b>WORD PERFECT</b>	<b>(New Release)</b>	<b>PARADOX</b>	<b>Call for Price</b>	<b>PROJECT SCHEDULERS</b>	<b>\$229</b>	<b>JUNIOR CORNER</b>	<b>\$319</b>
Reflex	249	Powerbase	199	MICROSOFT PROJECT	\$229	Lotus 1-2-3 Junior	\$319
Multimate	245	INTEGRATED/ SPREADSHEETS	59	SuperProject (IUS)	225		
<b>MULTIMATE ADVANTAGE</b>	<b>275</b>	<b>LOTUS 1-2-3 (V2.0)</b>	<b>\$319</b>	<b>HARWARD TOTAL</b>	<b>\$275</b>	<b>MISC. UTILITIES</b>	
Volkswriter Deluxe	159	Enable (New Version)	355	Project Scheduler 5000		FANCY FONT	\$155
Easywriter II/Speller/ Meier	199	Ability	299	(Scitor)	289	Wordplus (Oasis)	119
Edi & Wordix	255	FRAMEWORK II	415	Project Scheduler Network	395	pfs: pro!l	65
Finalword	209	Electric Desk	209	Timeline	275	Punctuation & Style	99
Samma III	335	SYMPHONY	439	LANGUAGES/UTILITIES		Quickcode III	149
Xy Write II Plus	219	Supercalc 3	185	CONCURRENT PC DOS		Quick Report	159
Think Tank	125	Multiplan	129	(w/windows)	\$185	d Graph III	149
Pfs: Write	85	pfs: plan	85	PL/1(DR)	489	D Util III	65
<b>DATA BASE MANAGEMENT</b>		<b>FINANCIAL</b>		LATTICE C COMPILER	\$275	K Graph	175
<b>KNOWLEDGEMAN/2</b>	<b>\$329</b>	<b>DOLLARS AND SENSE</b>	<b>\$115</b>	TURBO PASCAL	\$39	K Paint	85
<b>CORNERSTONE</b>	<b>275</b>	Managing Your Money	115	Pascal Compiler (MS)	199	K Text	109
Time IV	199	Howard Tax Preparer '86	115	C Compiler (MS)	265	Clout 2	149
d Base II	295	Call for Price		Cobol Compiler (MS)	399	Extended Report Writer	119
<b>RBASE 5000</b>	<b>355</b>	<b>CHARTMASTER</b>	<b>\$229</b>	Business Basic (MS)	303	Sideways	45
<b>R: BASE 5000 (Runtime)</b>	<b>255</b>	Sigmaster	185	<b>FORTTRAN COMPILER</b>	<b>\$239</b>	<b>PRKEY 4.0</b>	<b>\$89</b>
<b>d BASE III</b>	<b>379</b>	pfs: graph	85	(MS)		Norton Utilities	
<b>CLIPPER (d Base</b>		<b>GRAPHWRITER</b>	<b>\$329</b>	C86 C Compiler		(New Release)	59
<b>III Compiler)</b>	<b>389</b>			(Computer Innovations)	309	SIDEKICK (unprotected)	\$85
Data Base Manager II		<b>DIAGRAM MASTER</b>	<b>\$195</b>	Microsoft Macro		<b>CROSSTALK XVI</b>	
(alpha)	169			Assembler	109	(New Release)	\$115
		Microsoft Chart	179	P-Mate	189	Remote	109
						Smartcom II	109
						Sideways	45
						<b>SUPERKEY</b>	\$45
						Copy II PC	39
						DESK ORGANIZER	\$65

## ACCOUNTING SYSTEMS

	Information Unlimited (IUS)	Open Systems	Great Plains	Peachtree Series 8	State of The Art	Realworld (MB/S)	BPI
Accounts Payable	\$299	\$359	\$459	\$345	\$479	\$359	\$359
Accounts Receivable	299	359	459	345	479	359	359
Fixed Assets	—	359	—	345	—	—	—
General Ledger	299	359	459	345	479	359	359
Inventory	299	359	459	345	479	359	359
Job Costing	—	359	459	345	—	—	359
Material Management	—	359	—	—	—	—	—
Order Entry/Processing	299	359	—	345	479	359	—
Payroll	365	359	459	345	479	359	359
Report Writer	—	359	—	—	—	—	—
Sales Invoicing	—	359	—	345	479	—	—
Purchase Order Entry	—	359	—	—	—	—	—
<b>TCS Client Ledger System</b>	<b>\$1195</b>						
GNP CPA + Requires 1 2 3	\$379						

All prices and policies subject to change without notice.

## CAN'T FIND IT? ASK FOR OUR SPECIAL ORDER DEPT.

If you can't find the product you want here or you think it's not available through the mail, ask for our Special Order Department. There's a good chance we do carry the product (we're adding new ones every day). Or, we can get it for you from one of our suppliers—still at our low direct-to-you prices.

# LOGICSOFT

To order or receive technical assistance, call our National Hotline:

**1-800-645-3491**

NY State: 516-249-8440

Customer Service: 1-800-431-9037  
Circle #400 on reader service card.

EUROPE, 020-83.48.64

Telex: 10759 Logic NL

Mail orders to:

LOGICSOFT EUROPE BV

pb 9460, 1006 AL Amsterdam, Holland

# PERIPHERALS TO EXPAND YOUR SYSTEMS & CAPABILITIES.

FREE OVERNIGHT DELIVERY. LOWEST PRICE GUARANTEE. TOLL-FREE CUSTOMER SERVICE.

<b>PRINTERS*</b>	Mega Pak (256k)	369	VEN TEL	EVEREX
EPSON	Advantage (128k)	409	PC Modem Half Card	Excel Stream 20 Mb Int.
LQ1500**	I/D Plus II	129	1200 Plus	Excel Stream 60 Mb Int.
LQ1500 Sheet Feeder (Cut)	395			Excel Stream 60 Mb Ext.
JX-80	499			IRWIN
LX-80	229			Irwin 110 10 Mb Int.
LX-80 Tractor/Feeder	30			\$595
RX-100	399			KAMMERMAN LABS
FX-85	349			The Flight Tape Series
FX-185 (New)	479			60 Mb
JUKI				\$1,675
6100	\$365			The Flight Tape Series
6300	689			10 Mb
NEC				1,195
8850	\$1,459			MAYNARD ELECTRONICS
Pinwriter P2	559			Maynstream 20 Ext.
Pinwriter P3	895			\$1,139
DIKIDATA				Maynstream At 20 Int.
182 Plug & Play	\$219			\$949
192 Plug & Play	349			SYSGEN
193 Plug & Play	555			External 10 Mb
241D Plug & Play	1,749			\$845
SILVER REED				TALLGRASS TECHNOLOGIES
770	\$699			Tg 4060 w/controller
TOSHIBA				card
P351 Tractor	\$175			\$1,495
P351	999			TECMAR
1340	449			Qic 60 At
CITIZEN				\$1,275
MSP10	\$279			HARD DISK TAPE
MSP25	519			BACK-UP SUBSYSTEM
<b>MONITORS*</b>				ALLOY
AMDEX				PC Qicstar 30/60
Color 300	\$245			\$3,495
Color 500	389			Microstar 20/20
Color 600	415			2,275
Color 710	559			KAMMERMAN LABS
12" Green 300G	125			Masterflight 10/10
12" Amber 300A	145			\$1,795
12" Amber 310A	149			Masterflight 60/60
PRINCETON GRAPHICS				3,849
RGB HK 12	\$429			SIGMA
RGB SR-12	569			Stand Alone Winchester
Scan Doubler Board (for SR-12)	185			Tape 20/45
Amber Max 12E	179			\$2,675
QUADRAM				SYSGEN INDUSTRIES
Quadscreen 17"	\$1,459			Sysgen Plus
Ambrechrome 12"	155			LOGICSOFT PRODUCTS
TAXAN				Logicboard (six pak &
122	139			equin)
620	Call for Price			\$129
640	Call for Price			Logicboard AT (Advantage
<b>MULTI-FUNCTION BOARDS</b>				equin)
AST RESEARCH				\$279
Six Pak Plus (384k)	\$259			Logicmodem 1200B (Hayes
Six Pak Plus (64k)	239			equin)
Mega Plus II (64k)	275			\$195

\*Due to weight restrictions, Printers and Monitors are shipped UPS-free.

\*\*Parallel interface req.

All prices and policies subject to change without notice.

# LOGICSOFT

To order or receive technical assistance, call our National Hotline:

**1-800-645-3491**

NY State: 516-249-8440

Customer Service: 1-800-431-9037

Circle #400 on reader service card.

EUROPE: 020-83.48.64

Telex: 10759 Logic NL

Mail orders to:

LOGICSOFT EUROPE BV

pb 9460, 1006 AL Amsterdam, Holland

110 Bi-County Blvd., Dept. 54321

Farmingdale, NY 11735

CANADA: 416-283-2354

Domestic/Int'l Telex

286905 SOFTUR

## ■ PC PERSPECTIVES ■ JIM SEYMOUR

# UNBUNDLING SOFTWARE SUPPORT



*Everyone has complaints about the current system of after-sale software support. While no one has come up with the perfect solution, third-party support may be one answer.*

You can pay 'em now, or you can pay 'em later.

The principle applies well beyond the grinning auto mechanic in the TV commercial, who uses it to sell us more oil changes. Increasingly, it's going to apply to after-sale support for PC software.

We all know what's wrong with the current approach to after-sale support for buyers of popular PC programs: (a) The damn 800 number is always busy; (b) If it's not an 800 number, it's still busy all the time—and you have to pay for the call; (c) The people who answer the phone aren't very knowledgeable; (d) Many firms have a "call-back" policy—rather than dealing with your problem when you call, someone is supposed to "call right back" to help—but that call always comes long after you've solved the problem yourself or simply thrown your hands up in frustration; (e) All of the above.

Actually, that generalization is far too broad and thus unfair. I spend a fair amount of time on the phone with software vendors' support people, always anonymously, and frequently find knowledgeable, articulate people on the other end of the line.

And though the proportion of calls I have to pay for to free ones seems to have increased a good deal over the past year or so, I also suffer through fewer endless hours listening to the Silicon Singers' stirring version of "The Shadow of Your Smile."

Still, after-sale phone support for software isn't what it ought to be—or what it could be.

The problem is complex and reveals how far off we are when we try to describe what's wrong with the system symptomatically. What's really wrong with telephone support for software users hasn't got a thing to do with 800 numbers, terminally busy phone lines, or half-trained support people.

The real problem is that software companies see support as what the MBAs like to call a cost center, not a profit center. In other words, a drain on corporate resources, not an opportunity to turn a buck. And because deep down they consider after-sale support almost as unimportant as they consider documentation, in a time of shrinking profits and fierce pressure to cut costs, the support shop is always first to feel the knife.

A number of vendors are already charging for support calls. MicroRIM, Samna, MicroPro, and others have in place or have announced plans to start a policy of charg-

ing customers on a subscription or per-call basis for telephone support, usually after an initial getting-started period of 90 days or so. Others have been charging for some time.

Unfair? I don't think so. Software vendors have a number of arguments, some good and some embarrassing, for charging us for that continuing support.

**VENDORS' ARGUMENTS** Here are some of those arguments, from the reasonable to the ridiculous:

"Software support is very expensive, and only those who're going to use it ought to have to pay for it." Absolutely right.

"With our new release, we've put in such good, context-sensitive on-line help and made the program so easy to use, most people won't need to call." Well, maybe. Sounds a lot like Argument 1 to me, but fair enough.

"With our relatively mature product and stable or declining revenues, we just can't afford it." Is that the software business's way of announcing liquidation time? With hot new programs like Q&A, Paradox, Javelin, and Freelance coming out—all offering free on-line support—companies reining in support as an economic measure are really confessing their lack of faith in the future of their products.

"Most calls just ask for things people are too lazy to look up in the manual." True, but largely irrelevant: A lot of those folks don't know what to look for in the manual when the printer won't stop between pages so they can put in single sheets. They may not even know that the



Illustration: Mark Postleby

## ■ PC PERSPECTIVES

answer is, or ought to be, found in the software documentation. ("That is a printer problem, isn't it?")

"People keep asking the same questions over and over." Also true, but

doesn't that say something about the program's documentation . . . and maybe the program itself?

And that all-time hit, "People ought to go to their dealers for support." You're

kidding, of course. What dealer? Those highly touted "authorized dealers" whose staffs haven't yet figured out how to run the product demos, let alone how to work the program?

**UNBUNDLING SUPPORT** Whatever the reasons, the trend toward separating (or "unbundling") the price of the product and its subsequent support is well under way and unlikely to be reversed anytime soon. What's really interesting, though, is where all this is inevitably leading: toward independent, third-party software-support vendors.

And that's happening precisely because of that myopic cost-center-versus-profit-center perspective of most software publishers. As long as software vendors figure

- Third-party software support is a good deal for users, even if we have to pay for it.

they can only lose money on support, how high do you think improving support is going to rank in their priorities?

Put a reasonable profit opportunity into the equation, however, and the picture changes dramatically. And since no one's going to make a profit on slow, rude, inaccurate telephone support services, independent, third-party software-support firms are going to have little choice. They'll do it right, or they'll file for Chapter 11.

Third-party software support is a good deal for users, even if we have to pay for it. The idea isn't new. But making money at it will be. Susan Hamlin ran MicroSupport in Sausalito, California, for a while last year, but her limited capitalization ran out before MicroSupport could build a sufficient customer base. And John Commando offered third-party software support through InterSol in Braintree, Massachusetts, for a couple of years on a subcontract basis for some very well-known computer and software companies. He decided to get



## dBASE-III PLUS™ POWER TOOLS

FOX&GELLER

From the Enhancement Specialist

### QUICKREPORT™

#### dBASE Report Writer

A full featured report writer for any job—simple or complex:

- Connect up to 6 databases per report
- No programming required
- Draw reports on screen
- 16 levels of sorting
- 16 levels of totalling
- Use bold, underlining
- Print forms
- Date, arithmetic
- Up to 255 columns wide

POWERFUL,  
YET  
SIMPLE

Now you can  
create database  
applications in  
minutes without  
programming.

### QUICKCODE-III

#### dBASE-III Program Generator

Also Available:

dGRAPH-III—Quality graphics for dBASIC-III

dUTIL-III—Programming utility for dBASIC-III

**NEW** QUICKINDEX—Index Files up to 90% faster than dBASIC

Available from your local dealer.

**(201) 794-8883**

FOX & GELLER  
604 MARKET ST.  
ELMWOOD PARK,  
NEW JERSEY 07407



dBASIC™ Ashton-Tate

QuickReport and QuickCode™ of Fox & Geller

CIRCLE 246 ON READER SERVICE CARD

# TAXAN 600 SERIES

## Industry Standards Upgraded!

The Models 630 And 640 Are 100% Compatible With The AT&T 6300 and 6300 Plus!

A perfect upgrade/replacement for the standard IBM color graphics monitor and card, the Taxan model 630 and 555® create a higher resolution at a greater savings!



PRICE/PERFORMANCE RATIO

### 630 Super High Resolution Text and Graphics.

#### Superior Text and Graphics Beyond IBM.

640(H) x 200(V)  
Resolution  
(640(H) x 400(V)  
Non-Interlaced  
Resolution

0.37mm Dot Pitch  
24.75Khz Scan Frequency  
100% compatible with IBM PC, XT, and AT® when used with the Taxan 555 board.  
\$675.00 Suggested Retail



► Compatible with AT&T 6300 Computer

#### RGB Color, and FOUR Monochrome Capabilities In One Monitor!



► No one else offers the monochrome options available with the new Taxan 600 series!

The Taxan 630 & 640 monitors offer Green, Amber, B&W Reverse, and a White on Blue Background as their total spectrum of monochrome options.

Only Taxan offers such a wide variety of monochrome capabilities.

#### Total CAD/CAM Compatibility 720 x 400 Resolution!



The Taxan 640 The Ultimate In Monitor Resolution.

640(H) x 400(V)  
Non-Interlaced Resolution  
4,000 Character Display Capability  
0.31mm Dot Pitch  
24.75Khz Scan Frequency



► Compatible with AT&T 6300 Computer

100% Compatible with the new generation of graphics boards Taxan (555), Persyst B.O.B., Sigma 400®, Artist II®, STB 400® and others for the IBM PC, XT, and AT. \$775.00 Suggested Retail

© 1985 Taxan Corporation

# TAXAN

TAXAN CORPORATION  
18005 CORTNEY CT.  
INDUSTRY, CA 91748 (818) 810-1291

IBM, IBM PC, XT and AT are registered trademarks of International Business Machines Corp. Apple is a registered trademark of Apple Computers Inc. \*TAXAN 555 is a registered trademark of Taxan Corp. \*PERSYST B.O.B. and 400 are registered trademarks of Persyst Systems Inc. \*\*SIGMA 400 is a registered trademark of Sigma Design. \*\*\*STB 400 is a registered trademark of Control Systems Inc. AT&T 6300 and 6300 Plus are registered trademarks of AT&T Information Systems, Inc.

CIRCLE 489 ON READER SERVICE CARD

TAXAN EAST, MIDDLESEX BUSINESS CTR.  
111 CORPORATE BLVD. SUITE E  
S. PLAINFIELD, NJ 07080 (201)769-6500

## ■ PC PERSPECTIVES

out of the business 3 months ago.

"It's going to take someone with deep pockets and lots of patience," Commando says. "But it has to come. The economics of scale, avoiding the up-and-down work-

load and staffing requirements, knowing what support is going to cost in advance all make so much sense for software vendors."

Yep.

"Beyond that, consider who's really tending the phones most of the time at a lot of software firms. How do you quantify the value to those companies of getting their programmers off the phones and back to developing new products?"

Exactly. Writing and selling programs is a much different job from teaching people how to use them. And teaching people how to use that disk for which they've just spent a few hundred bucks is a great chance for someone to make a buck—as long as it's not the software vendor.

If we buy *SpreadStar* from MegaSoft, we figure they owe us free support for at least a year or so. But if that support's not there (and that's reflected in the reduced price we pay for the product), we're going to be open to buying some support, at least for a while, as we learn the program.

**WHAT PRICE?** The imponderable in all this, of course, is just how much we are willing to pay for support. And how we want to pay. By the call? At so much per minute, or per answer? On a subscription basis, allowing unlimited calls for a year? Or by prepaying for a maximum number of calls?

The people who figure that out are going to make a bundle. "I think third-party support is going to be a lot more interesting to smaller software companies than to bigger ones like us," says Tom Meadows, executive vice president at BPI Systems Inc., the accounting software company. "But it's a wonderful business opportunity, and the entrepreneurs are going to have a field day with it."

Commando agrees. Provided those entrepreneurs have deep enough pockets to build their market. Although he opted out of the game, Commando's cheering them on because he still stands to make a buck: InterSol developed a call-tracking database system for managing and analyzing support calls that's so good, software companies were more interested in buying that program for their in-house support shops than in farming support out to InterSol.

So Commando's selling the multiuser/networkable version of the program, *TSM/The Telephone Support Manager*, at \$5,000 a copy.

Should we call that after-sale support of after-sale support? ■

## A BETTER WAY TO...

### DRAW, POINT, SELECT & POSITION

For graphics, and menu selection – for direct interaction with your computer – nothing beats a light pen. It's fast. It's natural. And unlike a mouse, it won't fight with you for desk space.

Over 7500 FTG light pens are in use world-wide – they're the undisputed standard for the IBM PC.

Software is available for graphics, education, 3278 emulation, and much more. Plus, our MOUSETRAP™ is the link to most programs that can use a mouse. And, if you do any programming, you'll find it easy to add light pen support to your own creations.

For added versatility, check out our new PXL-350 HI-RES LIGHT PEN BOARD. It's fully supported by the DR. HALO II™ graphics program.

The pen is \$195. The board is \$149 with single-pixel and TopView™ interface software. We back both with a 30-day no-risk trial privilege and a two-year limited warranty.

Call today to try them, or for more information.



**FTG DATA SYSTEMS**

soon to be GRAPHIC INNOVATIONS, INC.

(714) 995-3900  
(800) 962-3900  
(800) 972-3900 (Calif.)

10801 Dale, Suite M-2, P.O. Box 615, Stanton, CA 90680 Telex: 887840  
CIRCLE 250 ON READER SERVICE CARD

# Introducing XyWrite III. The word processor that defines a new standard of performance.

If you're a word processor user with a heavy work load, you need a package that gets the job done on time.

Now there's a fast, powerful, easy-to-use package that virtually eliminates productivity bottlenecks. It's a package that's so flexible and so well supported that it can be your personal and corporate standard.

It's the new XyWrite III, with more than 475 features and functions. Such as multiple file search, sorted directories, and on-line reference manual. Totally redefinable keyboard, outline numbering, foreign languages, mail-merge, indexing and footnotes. There's also automatic syllable wrapping at line width or tab columns, full proportional printing and see-what-you-print display. You can have up to 9 windows and even use memory resident programs in XyWrite III.

Send us the coupon and discover how XyWrite III can set a new standard of performance for you.

\*Requires IBM PC, XT, AT or compatible hardware with 256K memory.



I'm serious about my word processing.  
Introduce me to XyWrite III.

Please send me \_\_\_\_\_ copies of XyWrite III  
\$395.00 each  
(plus shipping)  
\_\_\_\_\_ copies of XyWrite III  
demo disk  
\$7.00 each (credited  
toward final purchase.)  
(MA residents add 5%)  
\_\_\_\_\_ have a local XyWrite  
representative call me at \_\_\_\_\_



Card No. \_\_\_\_\_ EXP. DATE \_\_\_\_\_

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

**XyQuest** Inc.,

P.O. Box 372, Bedford, MA 01730. (617) 275-4439.

*Confidence Game.*



*It's knowing that the friendly voice at the other end of the line understands what you're saying. Can answer your technical questions, verify prices and shipping schedules. Or make good suggestions.*

*Join the Micro Mart Confidence Game.*

## **COMPUTERS**

AT&T Color and Mono Systems in stock \_\_\_\_\_ Start at \$1795

## **MULTIFUNCTION BOARDS**

We have a complete line of Multi-function Boards compatible with the Portable, XTAT

SIX PAK 64-384K, multifunc. \_\_\_\_\_

VO MINNIE I/O shortboard for Portable & AT \_\_\_\_\_ New Low Price!

ADVANTAGE 128K-3Mb, expansion for AT \_\_\_\_\_

RAMPAGE 64K-2Mb \_\_\_\_\_ NEW!

QUADRAM Quadboard Loaded. 384K \_\_\_\_\_ CALL!

QUADRAM Goldboard, 384K \$459

TECMAR Captain 0-384K, multifunc. \_\_\_\_\_ \$175

TALLTREE J-RAM II \_\_\_\_\_ Call!

## **GRAPHIC CARDS**

HERCULES Mono & Color Graphics cards \_\_\_\_\_ New Low Price!

TECMAR Graphics Master, HiRes Color & Mono supports Lotus \$449 QUADRAM Quadcolor / II color cards \_\_\_\_\_

PARADISE Multi-display or modular graphics cards \_\_\_\_\_ From \$199

STB Chauffeur & Plus \_\_\_\_\_ From \$289

SIGMA Color 400 for PGS SR-12 \_\_\_\_\_ New Low Price!

## **FLOPPY DISK DRIVES**

TANDON TM 100-2, DD/DS, 360K \_\_\_\_\_ New low, low price

1/2 HEIGHT Disk Drives from Shugart, Mitsubishi, TEAC and Toshiba. PC, XT & AT Compatible \_\_\_\_\_ From \$99

## **BEST SUPPLY ON EAST COAST**

## **HARD DISCS**

IRWIN/TANDBERG Tape back-up systems \_\_\_\_\_ From \$495

SEAGATE Fast 10, 20, 30 and 75 Meg. for PC & AT \_\_\_\_\_ From \$495

SYSGEN Complete line \_\_\_\_\_ Call for our special Sysgen pricing!

BERNOLLI TECHNOLOGY Hard disc Subsystems \_\_\_\_\_ From \$2595

PRIAM Superfast 40 & 60 Meg. for AT \_\_\_\_\_ Call

INTERDYNE 10 Meg. Reel to Reel Tape Back-up \_\_\_\_\_ \$439

Best availability of voice coil and stepper motor hard drives with high quality controllers \_\_\_\_\_

From \$495

## **SOFTWARE**

### **ACCOUNTING SPREADSHEETS & INTEGRATED PACKAGES**

SORCIM/IUS Complete line including Windows From \$295/each SORCIM SuperCalc 3, ver. 2 \_\_\_\_\_ New Low Price!

### **ENHANCEMENTS & UTILITIES**

FOX & GELLER Complete line for dBase III/V, RBase 4000

NORTON Utilities 3.0 \_\_\_\_\_ \$69

ROSESOFT ProKey 3.0 \_\_\_\_\_ \$89

CENTRAL POINT SOFTWARE

Copy II PC \_\_\_\_\_ \$35

SOFTSTYLE Set FX+ and Printworks, printer control \_\_\_\_\_

SIDEWAYS Inverts printout \_\_\_\_\_ \$35

BORLAND Sidekick and

SuperKey \_\_\_\_\_ From \$40

BORLAND Lightning and Reflex \_\_\_\_\_ New! Call!

### **COMPILERS & LANGUAGE TOOLS**

LATTICE C-Compilers \_\_\_\_\_ \$279

MICROSOFT Complete line \_\_\_\_\_

MICROSOFT QuickBasic \_\_\_\_\_ New Low Price!

BORLAND Turbo Pascal, Turbo Toolbox & more \_\_\_\_\_ From \$35 each

### **GRAPHICS**

Z-SOFT PC Paintbrush, mouse graphics \_\_\_\_\_ \$95

### **DECISION RESOURCES**

ChartMaster\_Latest Version \$239

MICROSOFT Chart \_\_\_\_\_ \$169

### **COMMUNICATIONS**

MICROSTUF Crosstalk XVI, Latest version \_\_\_\_\_ \$399

HAYES Smartcom II \_\_\_\_\_ \$85

### **WORD PROCESSING**

MULTIMATE w/spelling checker & tutorial \_\_\_\_\_ New Low Price!

SAMNA+ \_\_\_\_\_ \$329

MICROSOFT Word. New version \_\_\_\_\_ New Low Price!

LIFETIME Wordwriter Deluxe \$169

SSI WordPerfect, version 4.1 \$249

MICROPRO WordStar Professional series \_\_\_\_\_ New Low Price!

### **OFFICE & PROJECT PLANNING**

HARVARD Total Project Manager \_\_\_\_\_ \$299

SORCIM/IUS Super Project. \_\_\_\_\_ \$199

MICROSOFT Project. \_\_\_\_\_ \$175

### **DATA BASE MANAGERS**

Call for unadvertised Data Base Managers

MICRORIM 5000, Report Writer & Clout \_\_\_\_\_ New Low Price!

WARNER SOFTWARE The Desk Organizer \_\_\_\_\_ \$145

MICROSTUF Infoscope \_\_\_\_\_ \$99

*Trust Micro Mart for immediate information and advice on almost any micro-computer product. Our 15 million dollar inventory is on-line to our mainframe so we can verify, order, deliver and service. Without delay.*

*Call us with confidence.*

## **NETWORKING/PROTOCOL CONVERSION**

SNA & BISYNC 3780, 5251, Mod. 11 & 12, 3274, 3278

PC TURBO 186/187 board, 128K, 8087 Serial Board attached \_\_\_\_\_ \$375

IRMA Complete line \_\_\_\_\_ From \$849

## **PRINTERS**

We have thousands in stock

### **DOT MATRIX**

EPSON FX85/286 \_\_\_\_\_ NEW!

EPSON LQ1500/LQ800/LQ1000 \_\_\_\_\_ New Prices!

### **INKJET**

OKIDATA 192 & 193, ML84, Pacemark 2410 \_\_\_\_\_

OKIDATA NEW 2000 SERIES \_\_\_\_\_ NEW!

TOSHIBA P-341, P-351 & 1340 \_\_\_\_\_ New Low Price!

NEC New P-5 \_\_\_\_\_ New Low Price!

### **LETTER QUALITY**

NEC Spinwriters 2050, 3550, 8850 \_\_\_\_\_ New Low Price!

EPSON DX10, DX20, & DC35 \_\_\_\_\_ New Letter Quality Printers!

We carry a full range of form handling options.

## **CHIPS**

All our chips are tested and priced for quick sale. Call us!

INTEL 8087, 80287, high speed coproc. \_\_\_\_\_ Call for Market Price.

64K-256K RAMCHIPS \_\_\_\_\_ Call for Market Price.

128K Piggy-back chips for your AT \_\_\_\_\_ Call for Market Price.

## **MODEMS**

HAYES Smartmodem 300, 1200, 2400 & 2400 We have the best stock in the USA. \_\_\_\_\_ Call!

VENTEL 1200 Baud Half Card w/ Crosstalk \_\_\_\_\_ \$399

PEACHTREE TECHNOLOGIES

P-1200 ext. \_\_\_\_\_ \$269

## **MISCELLANEOUS**

MAXELL Diskettes \_\_\_\_\_ \$25

DYSAN Diskettes at the lowest price in the USA. \_\_\_\_\_ Call!

MOUSE SYSTEMS PC Mouse, optical w/ software \_\_\_\_\_ \$139

MICROSOFT Mouse, bus or serial mechanical. New Model In Stock

KEYTRONICS 5151 keyboards \$149

KEYTRONICS 5153 Keyboard with mouse \_\_\_\_\_ NEW!

KENSINGTON MICROWARE

MasterPiece \_\_\_\_\_ \$99

CURTIS Accessories, Pedestals, cables, etc. \_\_\_\_\_

GRAVIS Joysticks \_\_\_\_\_ \$45

QUORAM Microfazer print buffer 8-128K \_\_\_\_\_ From \$129

TRIPPELITE ISOBAR surge protectors, 4 & 8 plug \_\_\_\_\_ From \$49

POLAROID Palette \_\_\_\_\_ \$1245

## **MONITORS AND CRTS**

PGS Max12 (E), HX12, HX12(E), & SR-12 \_\_\_\_\_ New Low Price!

AMODEX Color 600 \_\_\_\_\_ \$379

AMDEX 722, New alternative to IBM enhanced monitor. \_\_\_\_\_ \$569

AMDEX 300A/300G/310A \_\_\_\_\_ \$129/5115/5165

©Copyright 1985, Micro Mart, Inc. Technology Corporate Campus 3159 Campus Drive Norcross, Georgia 30071

Prices are subject to change without notice and are similar, but may vary at over 20 Micro Mart Retail Stores.

Leasing and financing options are available. MasterCard/VISA or ask for:



PM 2-86

1-800-333-2333  
**MICRO MART**  
America's PC Specialist  
CIRCLE 133 ON READER SERVICE CARD

# If you want to run software with graphics on your monochrome monitor, we have some bad news.

**A**s we're sure you've been told, the only way to run software with graphics on a monochrome monitor is to buy a graphics card.

For \$499, the Hercules Graphics Card runs these best-selling programs:

Ashton-Tate, *Framework*  
BPS, *Overhead Express*  
Lotus Development, *1-2-3*, *Symphony*  
MicroSoft, *MicroSoft Flight Simulator*, *MicroSoft Word*, *MicroSoft Chart*  
Software Products Int., *Open Access*  
Software Publishing, *PFS: Graph*  
Sorcim, *Supercalc 3*

In monochrome only.

# And some good news.

For \$395, the Paradise Modular Graphics Card runs all these programs. In monochrome. And in color.

Arrays/Continental Software, Ultra File

Ashtron-Tate, Framework

BPS, Overhead Express

Brightbill-Robert, Graphix Partner

Chung Labs, GraphPlan

Dow Jones & Co., Dow Jones Market

Analysis

Lotus Development, 1-2-3, Symphony

MicroPro, Chartstar Planstar

MDBS, Knowledge Manager

MicroSoft, Basic Compiler, Basic Inter-

preter, Chart, Flight Simulator, Project, Word

PC Software of San Diego, Executive

Picture Show

Prentice-Hall, Executioner

Schuchardt Software Systems, Intecalc,

Intemate, Interupt, Inteplon, Inteword

Softrend, Aurora

Software Products Int., Open Access

Software Publishing, PFS:Graph

Sorcim, SuperCalc 3

Summa Software, Winning On Wall Street:

Trader's Forecast, Winning On Wall Street:

Trader's Data Manager

Advanced Ideas, The Game Show, Master

Match, Tic Tac Show

CBS Software, Big Bird's Special Delivery, Dino-

saur Dig, Ernie's Magic Shapes

Davidson & Associates, Math Blaster!, Word

Attack!

Designware, The Grammar Examiner, Math

Maze, Language Arts, Spellcutter, States &

Traits, Trap-a-zoid

Developmental Learning Materials, Alien Addi-

tion, Alligator Miz Demolition, Division, Dragon

Mix, Meteor Multiplication, Minus Mission

Eduware, Algebra 1, Algebra 2, Algebra 3,

Algebra 4, Algebra 5

Individual Software, Professor Pixel, The

Instructor, The Typing Instructor

Knoware, Knowware

Scarborough Systems, MasterType, Songwriter

Learning Co., Addition Magician, Magic Spells,

Moptown Parade, Number Stomper, Reader

Rabbit

Scholastic, Turtle Tracks

Sierra On-Line, Dragon's Keep, Troll's Take

Simon & Schuster, Typing Tutor III

Spinnaker Software, Alphabet Zoo, Delta

Drawing, Fraction Fever, Hey Diddle Diddle,

Kids on Keys, Kindercomp, Rhymes & Riddles,

Story Machine



The Paradise Modular Graphics  
Card runs all the popular programs.  
Hercules does, plus 150 more.

Springboard, Early Games for Young Children, Make a Match, Piece of Coke Match, Quizogen

Thoroughbred Software, Exploring the Amazing Food Factory, The Fascinating Story of Cell Growth, How Plants Grow, Migrating Molecules, Mastering Units of Measurement, Photosynthesis

Unicorn Software, Funbunch, Ships Ahoy, Ten Little Robots

Digital Research, DR Logo

Energetics, Energraphics

Fox & Geller, dGraph, OZ

Graphic Communication, Graphwriter

BASIC, Graphwriter Combination, Graphwriter Extension

Harvard Associates, PC Logo

Innovative Software, Fast Graphs

Mouse Systems, PC Paint

PC Software of San Diego, PC Crayon

Peachtree Software, Business Graphics System

Arktronics, Jone

Eagle Software Publishing, Personal Financier

Monogram, Dollars and Sense

Penguin Software, Graphics Magician

Sierra On-Line, Homeworld

Adventure Enterprises, Sea Dragon

Atarisoft, Centipede, Defender, Dig Dug,

Donkey Kong, Pac Man, Robotron, StarGate

Avalon Hill Game Company, Andromeda

Conquest, Computer Football Strategy, Computer Stocks & Bonds, V.C., Voyager

Broderbund Software, Serpentine  
CBS Software, Match-Wits, Mystery Master:  
Murder by the Dozen

Hayden Software, Sargon III

Innovative Design Software, Pool 1.5

Intelligent Statements, Asylum

MicroLab, Crisis Mountain, Doth in the Caribbean, Dino Eggs, High Rise, Miner 2049er

Muse Software, Castle Wolfenstein

Odesta, Backgammon, Checkers, Chess, Odin

Origin Systems, Ultima III

Orion Software, J-Bird

PC Software of San Diego, Championship Blackjack

Penguin Software, The Quest

Priority Software, Forbidden Quest

Scarborough Systems, Buck Rogers, Congo Bongo, Star Trek

Sentient Software, Cyborg

Sierra On-Line, BC's Quest of Tires, Championship Boxing, CrossFire, Dark Crystal, Frogger, King's Quest, Oi Well, Ultima II, Ulysses and the Golden Fleece

Sir Tech, Wizardry

Sirius Software, Buzzard Bait

Spectrum Holobyte, Gato

Spinnaker Software, Snooper Troops #1, Snooper #2

SubLogic, "Night Mission" Pinball

**I**t's true, Hercules only runs 10 of the 161 programs with graphics for the IBM PC carried by SOFTSEL®, the largest distributor of micro computer products.

Since the Paradise Modular Graphics card is 100% compatible with the IBM color graphics standard, it'll run virtually every program written for the PC. In monochrome. And in color. Now and in the future.

And we give you a \$50 trade-in allowance on your old Hercules or IBM card.

So see your dealer or call us. And get some good news for a change.

**PARADISE**  
SYSTEMS, INC

# The system & software you need

## HARDWARE

### DISK DRIVES f/IBM PC

TANDON TM-100-2 ..... \$84.95  
TEAC 555 ..... 94.50  
TOSHIBA 1/4 Height ..... 95.50

### HARD DISK DRIVES FOR IBM

#### **PRIAM**

##### HIGH SPEED INTERNAL HARD DRIVES FOR IBM AT

Complete with software, Mounting rails & Instructions. 30Msec Average Access Time.

J-RAM-40AT 51MB (\$42MB formatted) ..... \$1295

J-RAM-60AT 72MB (\$9.8MB formatted) ..... \$1495

##### PRIAM

##### HIGH SPEED INTERNAL HARD DRIVES for IBM XT with CONTROLLER

51MB (\$42MB formatted) ..... \$1495

72MB (\$9.8MB formatted) ..... \$1695

##### INTERDYNE

Internal 10MB tape backup for IBM PC/XT ..... 395.00

##### IOMEKA BERNOLLI BOX

New! Dual 20 (40MB) ..... 395.00

20 MB (2.10 MB in cabinet) ..... 2389.00

FIXT Autoboot ROM /PC only 89.95

##### TALLGRASS

Hard drive aux system with backup.

New! TG-5025 ..... 2675.00

Includes interface card for IBM-PC

### TAPE BACK UP SYSTEMS

Everex Excel 60 Internal ext. A1 895.00

Everex Excel 60 External ..... 995.00

Tecmar QIC 60H External (ext. A1) ..... 1495.00

### DISPLAY CARDS

#### AST

Preview Graphics Card ..... 269.00

#### EVEREX

Graphics Edge ..... 279.95

Edge ..... 279.95

#### HERCULES

Color Card ..... 159.95

Graphics Card (Mono.) ..... 289.95

#### PARADISE

Modular Graphics Card ..... 249.95

#### SIGMA

Color 400T /XTaxan 440/640 ..... 469.95

Color 400 /Princeton SR-12 ..... 469.95

TECMAR Graphics Master ..... 449.95

OUADRAM Quad EGA Card ..... Call

OUADRAM Quad EGA + ..... Call

### MEMORY EXPANSION CARDS

#### AST RESEARCH

AST 6-PACK PLUS 64K ..... 219.95

AST 6-PACK PLUS 384K ..... 249.95

For game port option add 34.95

#### INTEL

Above Board ..... In Store Only

#### ORCHID TECHNOLOGY

Conquest (MS) 8K with parallel/

serial and clock ..... 279.95

PC Turbo-185 w/Daughterboard ..... 579.00  
PC Turbo-166 w/Daughterboard & 8087 support board ..... 749.95  
..... 8087 optional

OUADRAM QUADBOARD  
New! Expanded Quadboard  
384K ..... 219.95

TALLTREE SYSTEMS  
J RAM-2 w/parallel, serial & clock OK ..... 239.95  
New! J RAM-3 256K w/parallel/serial/clock ..... 349.95

TECMAR  
CAPTAIN-54K ..... 194.50  
CAPTAIN-384K ..... 209.95

MEMORY EXPANSION CARD FOR THE IBM AT

#### AST

AST Advantage 128K ..... 369.95  
Advantage Pak - K ..... 129.00

OUADRAM  
Liberty AT 128K (EMS) ..... 369.95  
Quadboard AT (EMS) ..... 399.95

ORCHID  
ECCELL w/ECC (EMS) ..... 295.00

#### INTEL

Above Board for AT ..... Store Only

64K Memory Upgrade Set ..... Call  
256K Memory set ..... 34.95  
Intel 8087-3 for PC ..... 104.95  
Intel 80287 for AT ..... 179.95

### MODEMS

#### ANCHOR AUTOMATION

Volkswagen 12 RS-232 ..... 179.95

Cable for PC, Compaq ..... 11.95

#### HAYES

Smartmodem 1200 RS-232 ..... 369.95

Smartmodem 1200B with Smartcom II ..... 359.95

Smartmodem 2400 RS-232 ..... 579.95

Smartmodem 2400 Internal ..... Call

#### NOVATION

1200 + Internal Modem ..... 329.95

1200 + External Modem ..... 329.95

Novation 2400 Modem ..... 549.95

Includes MILK software

#### QUADRAM

Quadramodem II w/CrossTalk

XVI 300/1200 ..... 299.00

#### VEN-TEL

PC 1/2 Card Modem-(Internal)

w/CrossTalk XVI ..... 339.95

1200 Plus-External 300/1200 ..... 359.95

#### MONITORS

#### PRINCETON

HX-12 RGB Color ..... 449.95

MAX-12 Amber TTL ..... 179.95

SR-12 ..... 579.00

SR-12 w/Scan Doubler ..... 795.00

#### TAXAN

New! 640 ..... Call

122-12" TTL - Amber ..... 139.95

122-12" TTL - Green ..... 149.95

#### AMDEK

600 Color RGB ..... 399.00

710 Color RGB ..... 439.95

New! 722 Color RGB (for EGA card) ..... 499.95

### LASER PRINTERS

#### APPLE Laserwriter

..... Call

#### HP Laserjet

..... Call

#### SWEET-P 6-pen plotter

..... 795.00

#### SWEET-P 1-pen plotter

..... 295.00

## IBM® HARD DRIVE SYSTEMS

### — FREE —

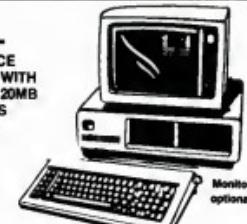
90-DAY ON-SITE SERVICE

PLUS ALPHA KEYWORDS WITH

IBM PC & XT WITH 10 OR 20MB

HARD DRIVE SYSTEMS

Total Value? **\$239!**



Monitor optional

### IBM PC SYSTEMS

• IBM PC 256K + 10MB Internal hard drive + 360K floppy drive

**\$1895**

### IBM XT SYSTEMS

• IBM XT 256K + 360K floppy

• 10MB VI hard drive,

**\$2295**

• IBM XT 256K + 360K floppy

• 20MB hard drive

**\$2450<sup>00</sup>**

### IBM AT SYSTEMS

• IBM AT 512K + 1.2 MB floppy

• 20 MB hard drive

**\$3750**

• IBM AT 512K + 1.2 MB floppy

• Priam 42MB hard drive.

**\$4495**

• IBM AT 512K + 1.2MB floppy

• 59.8MB Priam hard drive.

**\$4750**

TOSHIBA 360K for AT ..... 399<sup>00</sup>

### FLOPPY DISKS

SSD DS/DD P-341 ..... 795.00

SSD DS/DD P-351 ..... 1079.00

DS/DD P-340 ..... 429.00

#### TOSHIBA

AMERICAN POWER

300 PC ..... 399.95 330 XT ..... 449.95

450 AT ..... 549.95

### HARDWARE MISC.

#### DATASHIP POWER BACK UP

PC 200 200 watts ..... 295.00

XT-300 300 watts ..... 366.00

AT-500 500 watts ..... 549.00

#### EVENER

Expansion 8-slot Chassis ..... 699.00

#### EXAN

Gama Port ..... 19.95

PK-5151 Prof. Keyboard ..... 99.95

#### IMSI

Mouse w/Dr. Halo II ..... 109.95

#### KEYTRONICS

New! KB-5151 keyboard ..... 169.95

#### KENSINGTON

MasterPiece ..... 92.50

#### KOALA

Koala Pad ..... 85.95

Speed Key System ..... 99.95

#### MOUSE SYSTEMS

PC Mouse with PC Paint ..... 139.95

### SOFTWARE

#### FOR TITLES NOT LISTED HERE, PLEASE CALL US FOR OUR LOW PRICES.

#### ALPHA

Keywords "TOP RATED" ..... 49.95

#### ASHTON TATE

ASHTON TATE ..... Call

New! D BASE III Plus ..... Call

Framework II ..... 369.95

# at a price that you can afford!

PC MAG  
FEB. 11, 1985



## COMPAQ®

COMPAQ® PORTABLE	
256K, 360K floppy, 10MB hard drive	<b>\$2250</b>
256K, 360K floppy, 20MB hard drive	<b>\$2395</b>

## COMPAQ® DESKPRO

256K, 360K floppy, 10MB hard drive— Parallel Port, Color Card	<b>\$2195</b>
256K, 360K floppy, 10MB hard drive—Parallel Port, 10MB Tape back up, Color Card	<b>\$2750</b>
For 20MB Systems add *\$150*	

## COMPAQ® 286 COMPUTERS

Compaq Desk pro 286, 640K 1.2MB floppy, 20MB hard drive	<b>\$4195</b>
Compaq Desk pro 286, 512K, 1.2MB floppy, 20MB hard drive	<b>\$4195</b>

Compaq 286 Portable, Call for Custom Configurations

## EVEREX EXTERNAL STREAM 60

Excel Stream 60 External offers 60MB of tape backup on a single cartridge. Back-up can be performed using either mirror image or file by file mode. Restore a complete disk or single files. All with included easy to use menu driven software. Complete in cabinet w/power supply cable & interface card.

**\$995.00**

## INTERNAL HARD DRIVES FOR IBM PC AND XT

Internal 1/2 height hard drive, complete with controller card, ready to install.

**10MB \$36900**

**20MB \$47900**

## BORLAND

Turbo Lightning	57.95	LIVING VIDEO/TEXT	THINK TANK (req. 256K)	89.95
Turbo Pascal 3.0	36.50	READY		49.95
Side Kick (protected)	29.95			
Side Kick (non-protected)	44.95			
Super Key	36.50			
Turbo Pascal w/8087 support	57.95			
Reflex	57.95			

## BREAKTHROUGH

Time Line Project Mgr.	.219.95	MENLO PARK	In Search	299.95
Time Line Project Mgr. 2.0	.249.95		MICRO PRO	

## BOURBAKI

1-DIR	59.95	WORDSTAR PRO PACK	WORDSTAR 2000	239.95
			WORDSTAR 2000 PLUS	299.00

## COMPUTECH

New! Pony Express XL	149.95	MICRORIM	R Bass 5000	349.95
			New! Clout 2.0	139.95

## EXECUTIVE SYSTEMS

X-Tree	39.95	MICROSOFT	Chart	Call
			New! Flight Simulator	34.95

## FISCHER INNIS

Watchdog Security Program	.239.95	MULTIMATE	Multimate Version 3.3	229.95
(Requires hard drive)			Multimate Advantage	287.50

## FOX & GELLER

Quickcode 123	98.95	MICROSTUF	CrossTalk XVI 3.6	95.00
Quickcode III	149.95		Remote	99.95

## FUNK SOFTWARE

Sideways 3.0	39.95	MONOGRAM	Dollars and Sense/forecast	109.95
			MULTIMATE	

## GNP

INFOCOM	349.95	MULTIMATE	Multimate Version 3.3	229.95
Cornerstone	259.95		Multimate Advantage	287.50

INNOVATIVE SOFTWARE		Multimate Executive	249.95
Smart Software System	449.00		

## KOALA

Executive Presentation	89.00	OFFICE SOLUTIONS	Clipper II/D Bass III	349.95
			Officewriter/Speller	249.00

## LIFE TREE

Volkswriter Deluxe	159.95	PETER NORTON	Norton Utilities 3.1	48.95
--------------------	--------	--------------	----------------------	-------

## POWER BASE SYSTEMS

Power Base 2.1.....199.95

## PROGRAMMER'S CORNER

Lattice C Compiler.....269.00

P-Fix 80 Plus Debugger.....269.00

Prof. Basic.....79.95

Lattice Windows.....199.00

Panel for Lattice-C.....179.95

P-Mate Text Editor.....129.95

Plink-86.....269.95

Mark Williams C.....295.00

## ROSESOFT

Prokey.....69.95

## SORCIM

Supercalc 3 Release 2.....179.95

Super Project.....199.00

## SOFTWARE PUBLISHING

PFS FILE.....84.95 PFS Graph.....84.95

PFS Report 79.95 PFS Write.....84.95

Harvard Total Proj. Mgr. ....259.95

First Success.....214.95

## SSI

Word Perfect Ver. 4.1.....219.95

SYMANTEC Q & A.....189.95

## THE SOFTWARE GROUP

Enable Vers. 1.1.....299.95

VR COMPUTING

Relay Communication.....99.50

WARNER SOFTWARE

Desk Organizer.....59.95

TURNER HALL

Note-It.....59.95

## GRAPHIC SOFTWARE

### DECISION RESOURCES

CharMaster.....239.00

SignMaster.....166.95

Diagram Master.....199.95

GRAPHICS COMMUNICATION

Graphwriter w/extension.....329.95

Freelance.....219.95

ENERTRONICS

Energygraph.....169.95

Plotter Option.....59.95

Z-SOFT

PC-Paintbrush.....54.95

## IBM PCjr. CORNER

KOALA Koala Pad Touch Tablet for PCjr. with software	....\$34.95
Micro Pro Word Star Jr.	....\$49.95
SSI Word Perfect Jr.	....\$29.95
TECMAR PCjr. Captain 128K w/Parallel Port	....\$129.95

© 1986

# 47st. Computer

Computers and Business Equipment

67 W. 47th St. • 115 W. 45th St.  
NYC CA Lic. # 80119 / 691180

116 Nassau St. Near City Hall and  
the World Trade Center, corner, 39 Ann Street

Mall Order Address: 36 E. 19th St., New York, N.Y. 10003

IN NEW YORK STATE CALL 1-212-260-4410  
TOLL-FREE OUT-OF-STATE 1-800-221-7774

## NASSAU STREET STORE

1-212-608-6934 45th and 47th ST. STORES

1-212-398-1410

Store Hours: Sunday 10-4, Mon. thru Thurs. 9-6, Friday 9-2

- No surcharge for credit cards
- Prompt and efficient service
- Knowledgeable and experienced sales staff.

We accept MC, Visa, American Express & personal checks (no delays if approved). Minimum shipping and handling 15.95. Software found to be defective will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within this warranty period of manufacturer. Defective items must be sent to 36 East 19th Street, New York, N.Y. 10003. Att: Service Dept. Prices herein are for mail and phone orders only. Store prices may differ. Some items are subject to availability. Due to manufacturers price fluctuations, the prices may change beyond our control. This ad supersedes all previous PC ads. Not responsible for typographical errors.

Keep in touch with the latest items on the market and our up-to-date sale prices by checking our weekly ads in the National editions of the N.Y. Times and Wall Street Journal.

IBM is a registered trademark of International Business Machines Inc.  
Compu\* is a registered trademark of Compu\* Computer Corp.

PC Magazine Feb. 11, 1985  
Submitted Dec. 17, 1985.

*InfoWorld on EasyLAN*  
 "Any product that brings  
 down the cost and improves  
 the ease of use for LANs is  
 for the better."

# Buy A Local Area Network For Less Than \$100 Per PC

**STOP** buying expensive duplicate PC peripherals. Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disk is used infrequently.

The obvious solution to avoid expensive duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

## INTRODUCING THE *EasyLAN*™ OFFICE NETWORK

*EasyLAN* shares printers and disk drives between IBM PCs. *EasyLAN* can save you \$1000 or more per PC by eliminating duplicate equipment purchases. *EasyLAN* advantages:

- *EasyLAN* shares printers, disk drives, and information
- Easy to justify—less than \$100 per PC
- Easy to install
- Easy to operate
- Easy to order
- *EasyLAN* performs in the background.

*EasyLAN*'s low price matches the small business user's cost-sensitive budget. It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW, and the BENEFITS ARE HIGH.

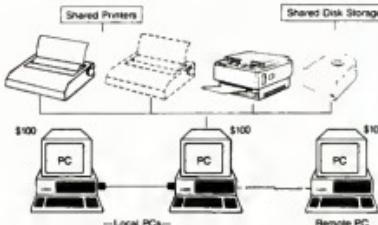
*EasyLAN* performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3™, WordStar™ and dBASE™.

## EASY TO OPERATE

*EasyLAN* network software allows PC users to share printer and disk peripherals. PCs are connected by *EasyLAN* cables plugged directly into your PC's standard serial communication ports and *EasyLAN* can be used with digital PBXs. *EasyLAN* supports geographically separated PCs using modems and dial-up lines.

*EasyLAN*'s performance meets your small office requirements to move word processing documents and spread sheets between PCs. For example, *EasyLAN* can move a 10 page document between two PCs, as a background operation, in less than one minute!

*EasyLAN* loads automatically at boot time. It manages the PC's serial and parallel ports for



"I look for those products that make my job easier and save me and my company money. I believe *EasyLAN* does both."  
 Carl Warren  
 Editor, Mini-Micro Systems

## *EasyLAN* Office Network

communications and printing. All *EasyLAN* operations may be started from any connected PC.

Printer sharing operates transparently with existing programs. Print files are automatically written to disk and scheduled for printing. Multiple printer per PC may be designated for specific office tasks.

For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with Printer 3 for printing continuous-form invoices.

Disk sharing uses *EasyLAN*'s COPY command, ECOPY,™ to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security is maintained.

## ORDER *EasyLAN* TODAY. 1-800-835-1515

## EASY SPECIFICATIONS

Each PC in the network requires an individual copy of the *EasyLAN* software, 128K of memory, a serial communication port(s), and DOS 2.0 or above. For your convenience, *EasyLAN* diskettes are not copy protected. *EasyLAN* runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.

## EASY TO INSTALL

*EasyLAN* can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. *EasyLAN*'s PRINT, COPY and DIRECTORY commands are very similar to DOS commands.

## EASY TO ORDER

*EasyLAN* is immediately available and easy to order. For a two PC network, start with the *EasyLAN* Kit. For each additional PC in the network, order the *EasyLAN* Expansion Kit.

The *EasyLAN* Kits include program diskettes, manuals and cables, which are shielded to maintain signal quality. All parts are warrantied for one year. *EasyLAN* program diskettes may be purchased individually; you supply your own cables, modem links or PBX connections.

Server Technology, Sunnyvale, CA 94086 408/738-8377

<i>EasyLAN</i> Order Form	Qty	Amount
<i>EasyLAN</i> Kit—for 2-PCs: One 30' Cable, Two Diskettes, and Manuals.	Price \$179.95	\$
<i>EasyLAN</i> Expansion Kit—for each additional PC: One 30' Cable, Diskette and Manual	Price \$109.95	\$
<i>EasyLAN</i> Diskette and Manual	Price \$ 79.95	\$
<i>EasyLAN</i> Cable—30'	Price \$ 49.95	\$
Custom length cables. Call for quote.	CA resident tax 7%	\$
	Shipping Charge: USA \$5.00 Out of USA \$15.00	\$

## TOTAL ORDER

1095 E. Duane, Suite 5107  
 Sunnyvale, CA 94086  
 408/738-8377

**EasyLAN**

For Ordering or Configuration Help Call Toll Free

**1-800/835-1515**

In California call 408/738-8377 MasterCard and Visa Accepted

CIRCLE 519 ON READER SERVICE CARD

## ■ COMPUTERS IN SOCIETY ■ STAN AUGARTEN

# TECHNOLOGY WITH A SMALL "t"

*A new technology doesn't just appear overnight. It subtly eases itself into society through side roads and back alleys. Here are four examples of the process in the works.*

We tend to think of technology with a capital *T*, as if it were a vast and impersonal force sweeping over society like a flood. But the invention and proliferation of new technology is really a subtle and personal process, a changing of old lamps for new that occurs in a million different places, times, and ways.

For example, an engineer in a huge electronics company hits upon an idea for a new gadget and builds a mock-up; the company's new-product committee, composed of the president and vice presidents of marketing and engineering, decides to put the thing into production; the trade press gives it favorable reviews; stores and mail-order outlets all over the country decide that they'd like to carry it; and thousands of people buy it. Slowly, as a result of a countless number of small decisions, a new technology insinuates itself into the world.

It's easy to generalize about technology, but reality is far more complicated, unpredictable, and quirky than any theory can possibly convey. Sometimes the best thing to do is to simply sit back and observe. However, it's not like watching the evening news; the process isn't at all dramatic, headlines aren't made, and history isn't changed—except in the long run. It's technology with a small *t*, seeping into the nooks and crannies, into the side roads and back alleys of the world. Keeping that in mind, I'd like to describe four unusual (but despite their atypicalness actually quite typical) episodes in the ongoing history of computers.

**FISH-CATCHING TECHNOLOGY** If you haven't seen a fishing rod since your days in summer camp when the best that fish-catching technology had to offer was a stainless-steel reel on a laminated stick, then I'm happy to inform you that the state of the art has advanced considerably. For you can now not only buy a computerized sonar to help you zero in on elusive schools of fish—such sonars have been around for years—but you can also get a computerized fishing reel. That's right. A computerized fishing reel. There's a description of one in the spring 1985 catalog of Cabela's, a big supplier of camping, hunting, and fishing gear based in Sidney, Nebraska.

The reel is made by Daiwa, a division of Seiko, the Japanese conglomerate best known for its watches. The reel is made out of black, anodized plastic and aluminum, with titanium, and it costs \$139.95—about 50 bucks more than a traditional (noncomputerized) top-of-the-line

reel. At first glance, it looks like a typical fishing reel, with a spool for the line and a two-pronged handle for wheeling in the line. But the computer sets it off from other reels. About the size of a small box of matches, the computer looks like a small digital clock. It's affixed to the top of the reel, just in back of the spool, and has a liquid-crystal screen and a few buttons.

The device seems easy to use. All you have to do is enter some basic information, such as the length of the line, and the computer automatically calculates the length of your cast and the speed of your retrieve. It also emits an electronic beep for every 10 feet the line moves in or out of the reel.

My first reaction to the thing was that it was an unsporting idea, a snazzy gadget that does more for the manufacturer's bottom line than for the ancient sport of angling. But I called up Daiwa, whose U.S. headquarters is in Glendale, California, and talked to an executive about the reel. He said that it is very useful for "deepjigging," or fishing in deep lakes and rivers; used in conjunction with a graph recorder (a fish-locating sonar), it will help you position your hook at just the right depth. He's used it several times, with good results. And fishermen obviously like it, he said, because they've bought thousands of them in the past year and a half.

**FINGERPRINT READERS** Alameda County, one of the most heavily populated counties in the San Francisco Bay area, has devised a new way to keep tabs on people who have been sentenced to house arrest.

Starting early next year, the county will



## ■ COMPUTERS IN SOCIETY

give each prisoner an electronic fingerprint reader made by Identix Inc., a Palo Alto, California, company that invented the gadget about 10 years ago under contract with the FBI. (There's a small market for Iden-

tix's fingerprint readers in government and industry, where they are used to restrict access to computer systems or research labs.)

In the Alameda scheme, a computer will dial the telephone number of a person

under house arrest and play a recording that requests him to identify himself. The felon must thereupon insert a finger in the Identix reader, which is hooked up to the phone; the reader scans the print and compares it with the one in the computer database. If the prints don't match or if the felon has failed to comply with the recorded request, the computer notifies the police and an arrest warrant is issued. It's an ingenious idea and should help ease overcrowding in the Alameda County jail.

**PHOTON WARS** If you've ever wanted to engage in the kind of ray gun shoot-em-ups that Luke Skywalker and his pals play in *Star Wars*, you'll soon be able to do so—without traveling to another galaxy.

An electronic battlefield for a game called Photon has opened in Kenilworth, New Jersey. Housed in a huge room crisscrossed with catwalks and shrouded in mist, Photon is played in teams with up to ten players on a side. Each player gets a photon pistol, a power pack, a vest, and a helmet; the object of the game is to kill the enemy and capture the other team's base station. Every hit with a photon pistol scores a specified number of points, and every shot produces a marvelous sound effect in each helmet's speakers. A microprocessor in each vest keeps track of the hits, and a computer tabulates the scores at the end of every 6½ minute game.

It costs \$3.50 to play a game of Photon, which was developed by an imaginative entrepreneur from Dallas by the name of George Carter. A mechanical engineer, Carter hopes to open 70 Photon centers nationwide; in addition to the center in New Jersey, 3 more will be in operation by the end of the year. "There's always a new sensation just around the corner," said Carter, "and we think this is the next one. We're targeted to the yuppie market, but we think we'll have a broad base of appeal." He's wrong, of course; most players will probably be teenagers.

**BBS FOR THE MASSES** A group of hackers-cum-social activists have established an unusual computer bulletin board in Berkeley, California. The activists, who belong to an organization known as the Community Memory Project (CMP), have installed three terminals in several popular

# How to teach an old dog new tricks

DOS is a good system, but...it is limited by its batch capability. Now with Pro-Command you can design command files to teach your computer to do what you want, when you want.

Pro-Command is a memory-resident extension to the command capabilities of DOS. Batch files run up to 4 times faster and give you more access to DOS than ever before. User interface and system management tasks are a snap to write with Pro-Command.

Pro-Command runs all of your existing batch files under Topview. What's more, Pro-Command lets you create and manage Topview windows.

#### Features:

- Batch files as subroutines
- Local subroutines in batch files
- Variables for saving information
- Arithmetic calculations
- String manipulation
- File I/O
- Screen and cursor control
- Flexible user input
- File and disk attributes (date, time, size etc.)
- Batch files (with redirection) under Topview
- Window control in Topview\*

If you've got an old dog you want to teach new tricks, get Pro-Command from your dealer now for only \$89., or call us direct. Major credit cards accepted.

Innovative Technology Inc.  
2710 Lancaster Road, Unit 101  
Ottawa, Canada K1B 4W8 (613) 738-3375

**PRO COMMAND**

\*Pro-Command Requires PC, MS-DOS, TOPVIEW, TOPVIEW II or later, and IBM PC compatibles. Requires Zilog Z80 Processor Board.

# CD ROM

**The First International Conference on CD ROM**  
sponsored by Microsoft Corporation

## PLAN NOW TO ATTEND

Be part of this important conference March 4-7th in Seattle. The focus will be wide-ranging, with a host of key authorities examining current and future CD ROM issues affecting book publishers, information providers, software developers, hardware, disc, and drive manufacturers.

### KEYNOTE SPEAKERS

William H. Gates, Microsoft Gary A. Kildall, Activenatura

### FEATURED SPEAKERS

Jane Brown, BRS	Arlin Raddaaks, Reference Technology
Robert Carr, Ashton Tate	François Robinet, Editions France Image Logiciel
Peter Cook, Grolier Academic American Encyclopedia	Edward Rothchild, Rothchild Consultations
Stan Corwin, The Record Group	David Roux, Datex
James DeVries, Laser Video	Edward Schmid, Digital Equipment Corporation
Stuart B. Flexner, Random House	Richard Schwartz, Dun & Bradstreet
John Gale, Information Workstation Group	George Wallace, McGraw-Hill
Stan Honey, ETAK	Howard R. Webber, Houghton Mifflin
Philippe Kahn, Borland International	Michael Zibart, Ingram Book Company
Kathleen Lane, Dataquest	William Zealick, TMS
Leonard Lohr, Vision Three	
Jan Lewis, Palo Alto Research Group	
Michael Liebold, Apple Computer	
Thomas Lopez, Cytron	
Gerald Lowell, Library of Congress	Registration price: \$799 (before Feb. 1); \$899 thereafter
Tom Kelly, 3M Corporation	To register, call: 800 323-7616, In California, 818 707-0102 or telex: 298812 TII UR
Alan Meckler, Meckler Publishing	For additional information, call: Min S. Yee, Conference Chairman or Steve Lambert, Conference Coordinator 206 828-8080
David Mastandrea, Hewlett-Packard	
Rick Meyer, DIALOG	
Dominic J. Miccolis, World Book Encyclopedia	
Robert Moes, North American Philips	
Michel Mourre, VIFI International/ Larousse	
Henan Oiano, Smithsonian Institution, NASM	

Microsoft Corporation  
10700 Northup Way  
Bellevue, WA 98004

**MICROSOFT**

## ■ COMPUTERS IN SOCIETY

Berkeley hangouts—La Pena Cultural Center Cafe, the Whole Earth Access store, and the Telegraph Avenue Co-Op supermarket—where anyone can use them during business hours. But you can't ac-

cess the system with a modem; the bulletin board was set up strictly for people who don't own a computer or who don't have access to one. In other words, it was set up for John and Jane Q. Public.

CMP was established by Lee Felsenstein, designer of the Osborne portable computer, and two colleagues. It has about eight or nine active members and is financed by royalties from two software packages, including the bulletin board program, which they wrote and licensed to commercial software companies; the royalties bring in about \$40,000 a year. The bulletin board is a technically interesting piece of software because it has an elaborate keyword system that enables a user to make a thorough canvass of all relevant entries and to make comment upon comment almost ad infinitum.

But the social aspects of the bulletin board are much more interesting than the technical ones. At heart, the bulletin board is an exercise in untrammeled freedom of speech. There is no gatekeeper to decide who may or may not use the system, no censor to purge the board of offensive remarks. Anything goes. So, in between the notices about cars for sale and apartments for rent, there are the goofy, the touching, the bizarre, the comical. Here's a small selection from the board:

"Reality fabric is a myth. The past is gone, the future hasn't begun, and the present is fast disappearing . . . . Feel the waves bear you over a powerless sea. Peer deep into its depths and find meaning. If meaning is created, then it is."

"I have a collection of smells in test tubes. If you would like to trade with me, leave a response or check for messages with the index word SMELLS. My name is Ray."

"Unhappy with present status of life! Cannot find any desirable women, not a one. Life is dull! I'm sick of Berkeley lesbians, what should I do? I'm straight, a young 40, very sensitive, and totally unable to cope with modern day society. Is there any alternative for me?"

The bulletin board has been in operation for about a year. It's begun to receive some attention in the local press, and about 1,200 people use it every month. CMP hopes to install several other terminals in Berkeley, particularly at the University of California, and to defray its costs by attaching coin boxes to the terminals and charging a dime or so for each entry.

Free speech has its price after all, even in Berkeley.

## ACCOUNTING FOR MICROS

**\$395**

Set of Four

**\$325** Set of Three

**\$465** Set of Five

### DEMO DISK

\$18.00



Dry off 5 programs above: 102, 402, 405, 408, 409. Demo disk \$18.00 (includes shipping). Considered versions of the programs give you the "feel" of data entry and access. Includes sample reports and instructions. Supply modules.

### THINN

**\$225** The "Catch-All" program. File any type of information for quick access. Name or subject organized with 15 lines of notes per name. Use THINN as a mailing list, filing system, notebook, etc. Can be used alone or with data files or other programs.

To: **THINN DEMO** . . . . . \$3.00

The "How To Order" section specifies modem and disk formats. You can pay by check, by VISA or MasterCard (we need your expiration date and card number), or by UPS COD (add \$2.50 COD charge). Our price includes shipping. Minnesota residents, add 6% sales tax. We ship most orders the same day.

ON ORDER BY PHONE: 612-339-2821

**ACCOUNTING FOR MICROS**

Allows up to 1,000 accounts & 1,000 transactions. Retain, maintain balances. Print payrolls, Year and Forecast. Includes: Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

**GENERAL LEDGER** ..... **\$125**

Allows up to 1,000 accounts & 1,000 transactions. Retain, maintain balances. Print Last Payroll, Year and Forecast. Includes: Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

**ACCOUNTS RECEIVABLE** ..... **\$125**

Allows up to 2,300 customers and 1,000 invoices per month. Invoicing categories: Inventory. Module keeps customer names and addresses. Invoices prints on plain paper or any pre-printed form. Statements can be printed at any time.

**PATROLL** ..... **\$125**

Will handle up to 100 employees with eight deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately. Prints checks and W2s.

**SET OF FIVE** ..... **\$465**

**SET OF FOUR** ..... **\$395**

**SET OF THREE** ..... **\$325**

**RUN ON MOST CP/M AND MS-DOS**

Apple II/II+ IBM PC XT/PC/XT/XT+ Sanyo 6300  
Commodore 64/128 RadioShack  
Computer Musician 32/64/128  
Epson FX-80/85/89/90/95/100/120/128  
Epson QX-10 Radio Shack CPM  
Other compatibles

**James River Group**  
INCORPORATED

Dept. PC  
125 North First Street  
Minneapolis, MN 55401

612/339-2521

PC MAGAZINE ■ FEBRUARY 11, 1986

102

*Make Any Computer Do Exactly What You Want With McGraw-Hill's*

# Contemporary Programming & Software Design Series

**From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer**

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

That's why McGraw-Hill's new Contemporary Programming and Software Design Series teaches you how to create your own software... either from scratch or by making key modifications to existing programs. There is nothing magical about it. You learn the process of building a computer program step-by-step with McGraw-Hill's *except Modules* sent to you one at a time, once a month. Each of the ten modules in the Series takes you through an important step in the development of the structure and logic of a program, including testing, debugging, and documentation.

## Unique Interactive Hands-On Instruction

Each module includes an easy-to-understand guide PLUS a 5 1/4" floppy disk containing typical programs and interactive instruction that you can run on any IBM or IBM-compatible computer for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have

completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.

## Learn the Foundation of All Computer Languages

Although the Series teaches you programming procedures, it is not aimed at

any one language or machine. Why? Because 95% of the programming process is carried out using design techniques that are independent of a specific language or machine. Nevertheless, we include enough training in BASIC and machine language to get you started. You'll find that the whole process of learning new languages will be greatly accelerated once you complete the Series.

## Create a Complete, Customized Family Financial Package As You Learn

The sample programs you work with throughout the Series are excellent learning tools. But they're more than that. By combining the sample programs onto one master disk, you'll create your own family financial package that will help you balance your budget, figure loan amortization, and much more. And—of course—you'll be able to further modify your financial package to fit your own specific needs!

## 15-Day No-Risk Trial

To order your first module without risk, send the postage-paid card today. Examine the first module for 15 days and see how the Series will help you make any computer do exactly what you want it to do!

**CREATE  
YOUR OWN  
SOFTWARE**

If someone has beaten you to the card, write to us for ordering information about the Contemporary Programming and Software Design Series.

**McGraw-Hill  
Continuing Education Center**

3939 Wisconsin Avenue  
Washington, DC 20016

IBM is a registered trademark of International Business Machines, Inc.



T • A • P • E

# BACKUP

---

## MEASURING SPEED & COST PER MEGABYTE

---

**T**ape backup is like an insurance policy. Everyone agrees that it's a good idea, but few know how to use it to its best advantage or even how to buy one. Both tape backup and insurance are based on the proposition that sooner or later something terrible is going to happen. You can pay now or pay later. Prudent business practice dictates that you pay now, because later will invariably be much more painful and much more expensive.

What is the real price of tape backup? The acquisition cost of the unit? The time that it takes to perform backup?

The cost of the media? How do you determine which unit fits your needs best?

In this comparison test, PC Magazine Labs looked at two basic measurements: speed (see the benchmark test results) and cost per megabyte (see

the features table). All the other criteria, such as tape format and ease of use, fell out naturally in the course of describing the units as we tested them. We tested 13 units: Alloy's PC-60, Cipher's 5210, Genoa's Galaxy 3260 and 3220T, Hewlett-Packard's HP 9142A, I<sup>2</sup> Interface's I<sup>2</sup>TAP10 and I<sup>2</sup>TAP45X, Lintec's LI-60685, Maynard's MaynStream 20, Micro Design's M10, Sigma Designs' SWS-0060, Sysgen's QIC-File, and the Tecmar QIC-60H. Our test units

were connected to identical PC-XTs, with 256K bytes of RAM, a 10-megabyte hard disk, and serial and parallel ports.

There isn't much point in getting more backup capacity than you have disk storage, and you might think that our cost-per-megabyte criterion unfairly favors units that seem to offer no more than a longer tape. That may be true now, but with the plummeting prices

*PC Magazine Labs tested 13 tape backup units, focusing on speed and cost per megabyte. Ultimately, the system that most impressed the editors was the one with the best software.*



Photo © 1986 by R. Brown

## ■ TAPE BACKUP

of 20- and 30-megabyte drives, you may kick yourself if you don't plan for more capacity.

There are differences in the way the drives for the higher-capacity units are engineered as well as software differences. Upgrading your tape system may not be possible later. The units we tested were similar in that they were self-contained outboard units, without integral disk drives. In most cases, they are the most attractive choice for the user who already has a hard disk. None of the units tested use the new PC/T format. Look for a comparison test of PC/T units in an upcoming issue. We will also be reporting on two other categories: internal backup units (for installation inside your machine) and combined tape/hard disk expansion units.

We found considerable variety in the units we tested, both in tape format and connection method. The simplest units attached directly to the 37-pin expansion connector on the XT's floppy disk control-

ler card. The rest had simple parallel interface boards, or even full-featured tape controllers, on half-size cards.

Gone are the full-length adapter cards crammed with chips. Advancing technology has consigned them to history. Both the size and complexity of the adapter card can be important issues. A unit with no adapter card can simply be taken from one XT to another to perform backup. Of course, the PC AT doesn't have the 37-pin connector, so this type of unit is suitable only for XTs and compatibles unless the manufacturer makes an AT adapter. Units with small, simple adapters generally have them inexpensively available separately from the tape unit. You can equip each XT with one, then use one tape unit to service the backup needs of an entire department's computers. A half-length card is always welcome in an XT.

Two factors make or break a tape backup unit. One is speed and the other is painlessness. It has to be fast enough so that



EDITOR'S  
CHOICE

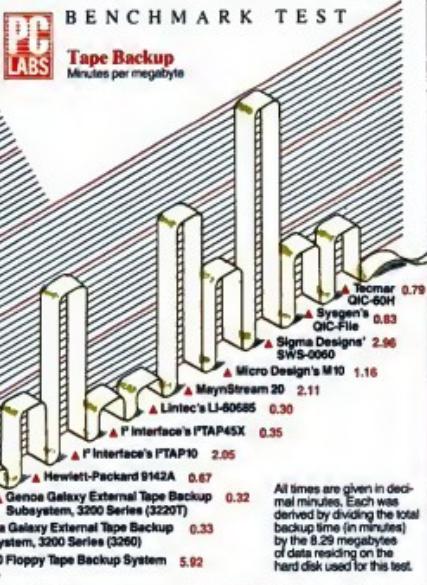
*Sygen's QIC-File is our hands-down choice for the best of the units tested. It's not the fastest or the cheapest. But it has the best software, and that's what counts. Sygen's unique automatic backup goes into action every time you power up your machine. You determine the backup criteria, and it works quietly in the background, preserving your files and keeping you from disaster's door. Genoa's Galaxy 3260 is our second choice, with an attractively low cost-per-megabyte and a handsome, informative user interface.*

you don't resent the time it takes to back up. It also has to be easy. Bad software will kill an otherwise good product. The amount of time it takes to restore files is immaterial because it is invariably less than the time it takes to rebuild a crashed hard disk. Virtually all the products tested here are incompatible with one another. They use different media, different formats, and different file-handling techniques. Each manufacturer is sure that its approach is the best and can defend it. (See Craig L. Stark's article, "Tape Backup: Technologies in Competition" for a full discussion of formats and media.)

**BRASS TACKS** We thought our test was going to be over before it began. The first several units out of the boxes didn't work. As is the way of all things electronic, we had to invest several man-days in them before we could determine that it was them, not us.

The company finally put a couple of its top system developers on a plane and sent them to PC Labs. They found a manufacturer's nightmare: a timing bug dependent on individual machines. None of their machines showed the symptoms; all of ours did. They spent the weekend rewriting their drivers. We can attest, finally, to the quality of the finished product.

Fortunately, the other products were more tractable. For the most part, howev-



*Effective tape backup operation must be fast, but ease of use factors in heavily, too. Notice that the two fastest units tested didn't get our vote for Editor's Choice.*

er, our testers felt the software was too difficult to use and generally didn't do all the things that a user really wants. The more we tested, the more sure we became that ease of use was even more important than speed when backing up. In fact, our overall Editor's Choice unit, Sysgen's QIC-File, gets the nod because its automatic backup software puts it in a class by itself.

In the dawn of tape backup—say, 2 years ago—the file-by-file versus image backup issue was critically important. The former was slow but reliable; the latter, fast but fraught with potential problems if you reformatted your disk or tried to restore onto a different hard disk, one with a different pattern of bad sectors. Advancing software technology has now blurred the distinctions, all but eliminating the differences. For example, I<sup>2</sup> Interface's backup system notes bad sectors on your hard disk by first examining the file allocation table (FAT). It then performs an image backup, copying your data on a track-by-track basis. If you restore to a different drive, one with different bad sectors, it rebuilds the files on the new drive file by file, allocating space for them from the new drive's FAT.

**FINAL EXAM** To wring out our test units, we loaded our testbench XTs with all of DOS 2.1's files, then built a large (2 megabytes) file and several small files. We also created a subdirectory with a copy of the large file and all the small files in it. This environment represents the way many hard disk users fill their machines: one or two copies of a large, valuable database and a bevy of small files of indeterminate value. Prudence says to back it all up. You can sort the wheat from the chaff after disaster strikes. It's also important to be able to back up or restore one subdirectory's files. After all was said and done, we had a daunting array of performance measurements and price-per-megabyte figures. You can see our picks in the accompanying tables and individual product reviews. Feel free to interpret the data your own way, but remember: Your hard disk is wearing out, even as you read this. Each time you turn on your machine, it creeps closer to its inevitable demise. Death and taxes are just as inevitable for PCs as for you.—Bill Machrone

## ALLOY'S PC-60

Alloy Computer Products' new PC-60 is its low-end entry into personal computer tape backup. Despite its low price, it has a full range of features and handles DC600A cartridges, for a capacity of 60 megabytes.

You plug the Alloy PC-60 into the 37-pin connector on the rear of the disk drive and go. What could be easier? Not much from the hardware side. The PC-60 projects an image of serenity—no screaming sounds on the high-speed winds, just quiet shuttling of the tape as it backs up and restores your files. The PC-60 uses a tape directory on track 1 of the tape, so you don't have to wind through the entire tape in order to read its directory. This is an advantage if you need to restore a single file: The PC-60 locates it in the directory, then proceeds to the file's actual location on tape to begin reading. It can find any file in 2 minutes or less.

The PC-60's software is a bit of a mixed bag. Some screens are very helpful, such

as the one that precedes formatting a tape. You have a choice of formatting from 2 to 12 tracks, and the display tells you just how long it'll take. Why would you want to format just 2 tracks? If that's all the disk you have, you don't have to incur the considerable time overhead of formatting the entire tape. It takes 14 minutes to do 2 tracks and 72 minutes to format the full 60 megabytes. You can add more formatted tracks later and append files to the tape without erasing the existing files. On the downside, the command structure for issuing



### F A C T F I L E

#### PC-60

Alloy Computer Products  
1000 Pennsylvania Ave.  
Framingham, MA 01701  
(617) 875-6100  
List Price: \$995 for the XT version; \$1,190  
for the AT version  
Requires: 256K RAM.

CIRCLE 686 ON READER SERVICE CARD

*ALLOY's PC-60 unit features several convenient features. The tape directory is stored on track 1 of the tape, so you don't have to scroll through the entire tape to read its directory. Also, you can format anywhere from 2 to 12 tracks at a time, so you can save time by formatting only those tracks you need.*



## ■ TAPE BACKUP

ing backup commands is irritating. An uppercase *B* tells the PC-60 that you want to back up all files on the disk, while a lowercase *b* means that you want to back up specific files. To make matters worse, both commands can be modified by slash commands. Restore commands are similarly confusing. With so many nice features, it's a shame that someone didn't spend a few more days on the user interface and put together a nice menu-driven system.

On the plus side, once you've figured out the command syntax, you can issue any of the PC-60's command repertoire from the DOS command line, which means that you can put the backup commands in a batch file. This is advantageous for end-of-the-day unattended backup. The append feature is nice if your particular data processing religious sect believes in updating backup tapes. The append process identifies each backup with a unique session number that appears in all subsequent directory references. You can back up from specific session numbers but be aware of the possibility of multiple files on the same tape with the same name.

Throughout the test period, the PC-60 was a trouble-free performer. It installed effortlessly and performed flawlessly. Since it runs from the floppy disk controller's expansion port and can handle up to 60 megabytes, I would recommend it as either a departmental or standalone backup system.—Bill Machrone

## I<sup>2</sup>'s I<sup>2</sup>TAP10

I<sup>2</sup> Interface Inc.'s I<sup>2</sup>TAP10, a cartridge-based 10-megabyte tape backup subsystem, is reasonably priced at \$995. It offers reliability, a certain amount of flexibility, and relatively hassle-free use. While not among the fastest tape subsystems tested, its speed is well within acceptable limits.

The I<sup>2</sup>TAP10 connects to the floppy disk controller port, making its installation easier than that of most other tape subsystems. However, the use of the floppy controller card also predicated a maximum transfer rate of 250,000 bits per second and compatibility with only those computer

**MENU**-driven software for the I<sup>2</sup> Interface I<sup>2</sup>TAP10 drive makes available several backup options. Choosing one is as simple as a single keystroke.



systems that have that external port.

Both the tape drive and its software are by Irwin Magnetic. The I<sup>2</sup>TAP10 uses either 3M DC1000 or IRWIN TC 200 mini-cartridges. The system software consists of three programs: Tformat, FIP (file interchange program), and ImageIBM. Tformat provides the utilities for servo writing, formatting, and certifying your tape; ImageIBM backs up and restores a complete image of the hard disk; and FIP performs file-by-file operations. All of the programs have their own menus and come with their own documentation. Be sure to check the printed documentation against the documentation on the disk; in the one I tested, the versions were different.

Before you use a tape, it must be servo written to set up the formatting parameters. Tapes are formatted to eight tracks per tape, 15 blocks per track, eight sectors per block, and 1,024 bytes per sector. The actual formatting time took 16½ minutes. If you display the tape's parameters, you will be shown the date formatted, the volume's name, the data's status (whether it is an image or file backup), the date of the last change, the number of bad blocks (if any), the location of the first free block, the number of bytes available, and the percentage of the tape used.

Because the I<sup>2</sup>TAP10 uses the floppy controller card, it assumes that DOS is transferring a legal file. Error correction consists of a read-after-write scheme. If the data written is correct, it proceeds to the next record. If it locates a bad area on the tape, it automatically retries to write the data five times. If it is still unable to write at that point, it labels that section of tape bad and continues to the next.

PC Magazine Labs' image backup took 2.05 minutes per megabyte. Each backup is saved within a "saveset," the equivalent of a disk subdirectory. Unlike some of the other units, the I<sup>2</sup>TAP10 does not allow you to restore an individual file from the image. However, Interface does claim its unit can restore a disk image to any hard disk—even if both of the disks have bad sectors in different areas. Essentially, when performing an image backup, the software looks up the FAT and the last available cluster and then backs up only the data and the location of the bad and unused sectors. When it restores the image, it compares the two FATs; if there are any discrepancies, it corrects the destination's FAT and proceeds with the restore.

While I had occasion to test this feature (one of the other hard disks was mistakenly reformatted and I couldn't wait for the test-

ing programs to create the almost 900 files) and was able to successfully restore the image to another XT, neither hard disk drive had bad sectors. Presumably, there is only one situation in which the operation will not work, and that is if you are restoring a full 10 megabytes of data to a hard disk that has less than 10 megabytes of space available. Interface's technical support representative said that in such a case the program informs you that the saveset is too large for the disk.

The FIP program's menu includes six choices. The first three are for backing up or restoring individual files or an entire directory. The options include selecting files by date and by date and time; wildcards are supported in all cases. When backing up files with a specific date, the program automatically goes through all subdirectories and selects the appropriate files. The fourth and fifth menu choices provide a directory of the cartridge and permit you to overwrite the data on the cartridge.

The last menu choice allows you to enter the program's command structure. The FIP language consists of 18 commands.

Three of them allow you to toggle between the FIP prompt and DOS. Another 3 are concerned with opening, closing, and creating of savesets. Most of the rest allow you to select, back up, and restore files. When a command requires input, you are prompted.

FIP backs up only 200 files per saveset. If the directory or file selection contains more than 200 files, the program automatically creates enough savesets to contain them. However, this same elegant solution does not hold when restoring the savesets—that is, they are not chained. You

must specify each individual one for restoration. In addition, the subdirectory must be present. As a result of this design feature, restoration can be slow with this unit.

The unit has a few additional quirks. At one point, while attempting to restore some files I had just backed up, I was informed that the cartridge was not formatted. With the Tformat program, I got a status report that said 30.53 percent of the tape was used. I dutifully removed the cartridge, reinserted it, and retried the restore—it went flawlessly. At another point, the program would not back anything up after five savesets, claiming the tape directory was full. Only 35.2 percent of the tape was used, with 6.7 megabytes of space still available.

While the Irwin software is functional, it lacks a unified structure. People who use the backup software once a month or even once a week are not likely to remember the names and commands of the various programs. Interface should have integrated them into one master menu.

In spite of its minor quirks, I<sup>2</sup> Interface's I<sup>2</sup>TAPI10 is definitely worth considering if you have a number of XTs or PCs with hard disks that need reliable backup. However, if you also have an AT, a Compaq, and a few clones, you should look elsewhere.—Vincent Puglia

## PC MAGAZINE FACT FILE

I<sup>2</sup>TAPI10  
I<sup>2</sup> Interface Inc.  
21101 Osborne St.  
Canoga Park, CA 91304  
(818) 341-7914  
List Price: \$995  
Requires: 128K RAM  
CIRCLE 863 ON READER SERVICE CARD



**EASY:**  
I<sup>2</sup> Interface's  
I<sup>2</sup>TAPI10 drive  
connects directly to  
the floppy controller  
card. This makes the  
unit easy to install  
and to use, but holds  
the data transfer rate  
to a maximum of  
250,000 bits per  
second. However,  
the I<sup>2</sup>TAPI10 is  
reliable; it uses the  
read-after-write  
error correction  
scheme to verify  
backed-up data.

## HEWLETT-PACKARD'S HP 9142A

The HP 9142A tape drive system from Hewlett-Packard is a 60-megabyte streaming tape cartridge system that offers relatively fast image operations, slow file-by-file backup, the ability to define up to four volumes that act as drives, and an error-detection and correction technique that ensures reliability. In addition, the unit comes with a variety of software that makes good use of the XT's function keys.

Since the HP 9142A subsystem requires its own controller, installation simply means opening your XT, plugging in the card, and connecting the cable. The software installation procedure copies the

## ■ TAPE BACKUP

appropriate programs to the hard disk. However, the HPTAPE.MSG file must be in the current directory, although the documentation does not mention this. At the end of the installation program, you are given the option of creating a RAMdisk with as much as 128K bytes of your computer's RAM.

Once the unit is installed, you must format the tape by calling the *HPTape* program. While the formatting is in progress, you can exit to DOS and let the formatting continue in the background. Since formatting takes approximately 85 minutes, the ability to exit to DOS is more than a frill. If you try to reexecute the program while the program is still formatting, you are greeted with a "tape drive is busy" message.

After formatting, you need to assign the tape volumes. You can divide a 600-foot tape into as many as four 15-megabyte volumes, then name the volumes, which are also automatically assigned the DOS drive letters D through G. If used as a floppy, each volume can be made to store, manipulate, and execute files.

Although *HPTape* lets you rename the

volumes, format and reread the tape, and gives you on-line help, it is used mainly for image backup and restoring. The backup and restore operations are fairly straightforward. You select the source and destination from a multiple-choice list, then press F1. Since the HP 9142A has no facilities for reading a directory from *HPTape*, you must exit the program and use the *Fileman* program.

*Fileman* is devoted to individual file management. With it, you can perform most PC-DOS command operations. You can also expand or contract directory lists

ings. Backing up files consists of choosing the edit function, selecting the appropriate tapes, opting for the copy feature, positioning the cursor on the drive and subdirectory, hitting the Begin key, and reaffirming the copy procedure. During that time, the program must read the disk directory. Once copying begins, *Fileman* lists the files in descending alphabetical order in a column on the right-hand side of the screen. When copying files, the program displays the source path but not the destination path.

Although the speed of image operations is quite respectable, the *Fileman* file-by-file operations are ridiculously slow and tedious. The standard DOS COPY command works much more easily and is more elegant. *Fileman* also allows you to copy from one volume of the tape to another; however, the process is even slower than that of copying files from the hard disk to the tape.

One reason these file-by-file operations are so slow is that the software must return to the directory area to add the file data each time it copies a file. Another reason stems from the error-detection and correction techniques. The HP 9142A uses a 5-byte CRC code; it also uses a PC/T-like format, creating redundant records based on data from the two preceding records. Because of this redundancy, you do not have a full 60 megabytes for storage.

Two other points should be made. First, *HPTape* remaps the directory when performing a restore; therefore, restoring to another hard disk should pose no problem. Second, the program does not use the archival bit, which means you cannot select files by date for backup.

The HP 9142A may be many things, but fast is not one of them. Evidently, someone at Hewlett-Packard realized this and included the RAMdisk option. However, this is only a jerry-rigged solution, and many people may not be willing to devote RAM to act as buffers.

Other features suffer from other problems. *Fileman* allows you to search for files on the tape; however, this feature is about as useful as a pair of glasses to a blind man; a \*.COM query only returns the message that at least one .COM file exists in the highlighted directory. Also, not only did the FIND feature not report which



### F A C T F I L E

#### HP 9142A

Hewlett-Packard Co.  
3000 Hanover St.  
Palo Alto, CA 94304  
(415) 857-1571  
List Price: \$1,889 w/interface card  
Requires: 256K RAM, DOS 2.0 or later.  
CIRCLE 880 ON READER SERVICE CARD

**HEWLETT** Packard's HP 9142A tape backup unit uses a 60-megabyte streaming tape system. Its software includes a variety of useful programs, such as an up-to-128K-byte RAMdisk. It also gives you the option of dividing a tape into as many as four 15-megabyte volumes, each of which acts as a separate drive.



.COM file existed, but it did not state how many .COM files existed.

The documentation for the HP 9142A consists of two manuals, one for the controller and another for the unit itself. Both manuals are well illustrated and organized; they include a table of contents, an index, a glossary, a number of appendixes, and chapter tabs. In addition, they are liberally sprinkled with "hints"—including some that are quite obvious, like "You cannot use Image Copy until you have formatted the tape cartridge and assigned volumes." There is also a quick reference card.

I pity anyone who needs to call Hewlett-Packard for technical support. Because of the corporation's size and the number of products it markets, you might not easily find someone familiar with this product. Therefore, if you purchase a unit, make certain you know whom to call for technical assistance.

The HP 9142A should be considered in two cases: If you intend to do only disk image operations, or if you have a spare weekend to do a file-by-file backup.

—Vincent Puglia

## I<sup>2</sup>'s I<sup>2</sup>TAP45X

I<sup>2</sup> Interface's I<sup>2</sup>TAP45X tape backup unit is full of surprises. It offers only image backup of your hard disk plus a choice of image or file-by-file restoration. I<sup>2</sup> Interface has also come up with an innovative solution to the pitfalls usually associated with restoring a hard disk image onto a different hard disk.

The drive uses the QIC-24 tape format with either 300XL or DC600A tape cartridges. It is about half the height of the PC and about equal to it in length. The I<sup>2</sup>TAP45X runs from its own controller card, so installation on a standard PC-XT is easy enough but not as easy as with units that connect directly to the floppy disk controller. No tape formatting is necessary, but when you first insert the tape, the unit takes a few seconds to perform tape diagnostics.

The I<sup>2</sup>TAP45X's software can run from either the floppy disk drive or hard disk. It



offers you but a single backup option—image capture of your entire disk. When you ask the software to begin capturing your hard disk's image, it informs you that a temporary file is being created on the hard disk. Then, if it needs to, the unit automatically rewinds your tape. Once the backup actually begins, a handy little on-screen bar graphic tells you how far along in the backup the tape is.

Backing up a 10-megabyte hard disk image is fast—perhaps ten times faster than the average file-by-file backup. PC Magazine Labs timed an unverified image backup with the I<sup>2</sup>TAP45X drive at a lightning 0.35 minutes per megabyte of data. Adding in a disk/tape comparison, the total jumped considerably, but was still comparable to a verified file-by-file backup on most of the other drives tested.

Restoring the image was also a snap. The I<sup>2</sup>TAP45X was so much faster than the other tape drives I tested that I found myself relying on it whenever I needed to restore images quickly onto other hard disks. Some of its speed can be attributed to the I<sup>2</sup>TAP45X drive's unusual ability to verify image backups. Most other tape

## IMAGE

only is the rule with the I<sup>2</sup>TAP45X tape backup subsystem. This unit performs some of the fastest image backups on the market, and checks the file allocation of the hard disk to which data is being restored to make sure it does not corrupt good data by writing it over onto bad sectors.



## F A C T F I L E

**I<sup>2</sup>TAP45X**  
I<sup>2</sup> Interface Inc.  
21101 Osborne St.  
Canoga Park, CA 91304  
(818) 341-7914  
List Price: \$1,795  
Requires: 192K RAM, DOS 2.0 or later.

CIRCLE 882 ON READER SERVICE CARD

drives are able to verify only file-by-file backups, a somewhat less streamlined process.

One of the usual pitfalls of an image backup is that it is like taking a snapshot of the disk, bad sectors and all. Problems arise if your disk fails and is permanently damaged, in which case your original hard disk image must be restored onto a different disk. The new disk may also have bad sectors, which, unless you are incredibly lucky, would be in different locations than the bad sectors on the old disk. When an image is restored from tape to disk, it is usually done without regard to where the new bad sectors are, so you are faced with

## ■ TAPE BACKUP

the possibility of corrupting good data by writing it to bad sectors on the new disk. To our surprise, however, an I<sup>2</sup> Interface spokesman informed PC Magazine Labs that the unit's image restore function takes bad sectors into account. The tape drive "looks at" the FAT (file allocation table) on the hard disk before doing a restore. If there are bad sectors on the disk, it notes them and avoids writing good data onto them when it overlays the image from the tape onto the disk. We could not garner conclusive evidence that the tape drive actually performed in this manner, though, because none of the IBM PC-XTs used for our testing contained any bad sectors on their hard disks.

If you make an image backup of your hard disk, it is especially important that you are able to compare the data on the tape with the data on your disk. The I<sup>2</sup>TAP45X software permits this option on its menu, aptly calling it Compare Disk/Tape. However, the comparison process is not nearly so neat and elegant as the I<sup>2</sup>TAP45X's backup and restore functions. Comparing disk/tape images is a stop-start process during which time the tape drive sounds like a heavy-breathing, obscene phone caller. As I mentioned, the I<sup>2</sup>TAP45X drive also offers the option of single-file restoration, which automatically includes verification. There is no option for a directory restore.

Other menu options allow you to display a directory of the tape (regular or wide) or to retension the tape within the cartridge, a process that takes about 2 minutes for a 300XL tape. The directory option displays only a single screenful of your directory at a time. When you hit a key to see more of the directory, the software completely rewrites the screen. Why its designers opted for this slow, unappealing method over a scrolling, DOS-style directory display is difficult to understand. The directory could also be improved by the addition of some indication of used and available tape capacity.

In general, I found I<sup>2</sup> Interface's I<sup>2</sup>TAP45X drive a pleasure to work with. I liked the speed of the image backup and restore and the apparent ability of the drive to restore the image to any hard disk. If the designers of this speedy little unit have truly solved the problem of image restora-

tions onto other hard disks (and PC Magazine Labs has no reason to believe they have not), then the I<sup>2</sup>TAP45X may just represent the shape of things to come in tape backup technology.—Joe Desposito

## MICRO DESIGN'S M10

Micro Design International Inc.'s M10 differs from most other tape backup subsystems in three ways. It uses microreels rather than cassettes or cartridges for storage; it allows you to mount the reel as drive D;—an extremely useful feature if your hard disk goes down and must be sent out for repairs—and it offers only image backup with image and individual-file restore.

The M10 is striking to look at. Black with light-gray sides, it resembles a finely engineered audio cassette system. The lightweight unit even comes with a handle that doubles as legs so that the system can be tilted to a comfortable angle.

Installing the hardware is as simple as connecting the cable to the floppy controller card. (Don't rule out the M10 because you have an AT or a Compaq; Micro Design offers a free adapter that connects its unit to the AT, Compaq, and a number of other compatible machines.) You then insert the microreels onto the door, close the door, and press the load button. You will hear a slight whir as the tape is unwound and respoled to a reel inside the drive. When the reel is loaded, the door is locked.

The software consists of five programs: TFormat, TImage, TSelect, Mount, and

### PC MAGAZINE FACT FILE

#### M10

Micro Design International Inc.  
6566 University Blvd.  
Winter Park, FL 32792  
(305) 677-8333  
List Price: \$525  
Requires: 128K RAM, PC-DOS 2.0  
CIRCLE 660 ON READER SERVICE CARD

**MICRO** *Design International's handsome, lightweight M10 might be welcome on your desk for its design features alone. It offers only image backup onto microreels, rather than the standard cassettes or cartridges, and can be mounted as drive D: in your system—a useful feature in case your hard disk dies and must be sent out for repairs.*



Unmount. The installation procedure, which is accessed through a batch-file program, consists of copying the files with a Verify option and changing the CONFIG.SYS file so that the device is set to the tape system driver. Formatting the tape takes a little over 20 minutes, at the end of which time the system beeps. You are then requested to enter tape and volume names and are given an opportunity to verify the tape, which costs you an additional 8 minutes. During the formatting and verification processes, tick marks showing the percentage completed appear on-screen.

If you are a firm believer in the file-by-file school, the M10 will score poorly—it supports only disk image backup. However, you can select and restore individual files from the image. It copies your disk's image onto tape; then the program displays the percentage completed in installments of 5 percent. When restoring the image, the software remaps the directory and lays down the files according to the new map.

When performing a restore with TSelect, the program automatically reads, then displays, the root directory. If the files you wish to select are in another directory, you must locate that subdirectory in the listing and place the cursor over the subdirectory name. In addition to the cursor keys, you can use the PgUp and PgDn keys. At that point you can select the appropriate files in the new subdirectory and wait until the new listing reappears. You accomplish file selection individually or all in one shot. If your subdirectories are as large as mine, this constant reading and writing of directories will give you enough time to get and drink a cup of coffee.

There are two other drawbacks to the TSelect program. Because the software does not ask for a destination, you must be logged onto the target directory. Also, the program itself must reside on the C: drive. Therefore, if your hard disk crashes and must be reformatted, you need to reinstall the M10 software first.

The Mount program allows you to use the subsystem as a floppy disk. Once mounted, you can use any of the DOS commands to access it and manipulate files from it. Note, though, that the program does not let you access files created with a disk image backup. The command Mount W creates a number of write buffers and

increases the speed by about 70 percent; however, if power is interrupted or the machine shuts down, all data not written to tape is lost. A tape mounted with the W option must be unmounted.

Despite all its good features, the M10 does have some distressing design problems. While the idea of using reels for storage brings up visions of mainframe power, the experience is more mundane. For one thing, the reels are extremely fragile; they tend to unwind easily, get lost beneath pa-

---

## ■ If you are a firm believer in the file-by-file school, the M10 will score poorly—it supports only disk image backup.

---

pers, and roll onto the floor. Respooling the reel is not only difficult but virtually impossible. And, if the exposed tape comes in contact with some dirt (which is highly likely if it falls to the floor), it will cause the CRC error correction technique to find errors. If the tape fails during the formatting process, it is noted and the tape cannot be used. Another problem is that the reels can get caught inside the drive and refuse to unload.

According to a spokesperson at Micro Design, the Intel 8272A chip on the floppy controller has a 30 percent fallout rate. IBM doesn't test the floppy controllers for tape-drive usage. If your M10 won't operate because of the controller card, Micro Design offers a trade-in for the card.

The manual I received consisted of photocopied pages stapled together. Most of its 30-odd pages were devoted to installing the hardware and software and to the error code messages. Virtually no screen shots or concrete examples were provided.

I might want to have the Micro Design M10 sitting on my desk for aesthetic reasons, but I wouldn't be able to trust myself with those microreels—I'd be tempted to toss them out the window during the next ticker-tape parade.—Vincent Puglia

## LINTEC'S LI-60685

Lintec's LI-60685 is a no-nonsense, 60-megabyte tape backup subsystem that is made by the Archive Corp. and that Lintec sells as an OEM. It comes with its own customized version of Software Extraordinaire's popular *Fastback* software. Priced at \$895, it is one of the more competitive units reviewed. Except for one flaw in the cabinet's design—it has no tape guides or door—the Lintec unit could be an excellent choice for many users.

Installing the Lintec subsystem is simply a matter of plugging in the controller card and connecting the cable. The unit uses DC 600 tape cartridges for storage. The aforementioned design flaw manifests itself as soon as you attempt to insert the cartridge. Since the cabinet has only an empty slot, the tape tends to have too much play and occasionally slips into the track at an awkward angle. You have to keep fiddling with it until it slides in correctly. Nor does the unit come with a button to eject a tape, so that you have to resort to brute force to pull it out.

The *Fastback* software consists of four files, including on-line help. One of them, the installation program, is used for setting the controller configuration parameters. If you have a standard XT, the defaults will be fine, so you do not need to run the installation program. While the main program can be in its own subdirectory, the configuration and help files must be in the current directory. The only other executable file is the *Fastback* backup and restore program.

The *Fastback* menu is bare and to the point. It consists of a window for listing the available menu choices and another window that acts as a combined message/command line. The menu choices include operations for image and file-by-file backup, restoration, and verification; utilities for retensioning, erasing, and rewinding the tape; and the ability to list the tape's directory, search for a segment, and obtain a tape status report.

Image backup on the Lintec unit is simply a matter of indicating your choice from the menu, entering the drive to be backed up, and confirming your decision twice.

## ■ TAPE BACKUP

**LINTEC'S LJ-60685**, at \$895 for a 60-megabyte system, offers one of the most reasonable cost/backed-up megabyte ratios on the market. Lintec supplies Software Extraordinaire's Fastback software with the unit, which offers both image and file-by-file backup and restoration, as well as a number of useful tape utilities.



At an even 0.30 minutes per megabyte of data, the image backup was one of the fastest timed. Along with a message to tell you that the backup has been successfully completed, *Fastback* informs you of the number of soft errors and underruns. Soft errors are the corrections the software made as a result of the read-after-write error correction technique. As long as the number of soft errors remains less than 20, the tape remains usable. Underruns are the times the tape had to wait for data to be transferred.

Opting for a file-by-file backup brings up a command line. The syntax is essentially like that of DOS. You specify the drive, the subdirectory, the filename, and any options. *Fastback* offers a number of options including before or after a given date, on the current date, with or without archive changes, reverse date, since or until a specified date, all but a specified date, hidden file backup, and subdirectory backup. *Fastback*'s file-by-file backup reads a block of disk data at a time and then writes it to tape. When backing up the entire disk, the program automatically creates separate

### PC MAGAZINE FACT FILE

#### LJ-60685

Lintec Inc.  
P.O. Box 2381  
Saratoga, CA 95070  
(408) 370-7400

List Price: \$895; additional card, \$285  
Requires: 256K RAM, DOS 2.0.

CIRCLE 625 ON READER SERVICE CARD

levels within a DOS segment for each subdirectory.

Like the backup operation, the restore function uses a command line. When restoring files, you have a number of choices. You can restore an image, restore file by file, or restore selected files from the image. Whichever you choose, you must advance the tape to the segment that contains the backup. Otherwise, the first segment available with the selected files will be restored. Restoring the subdirectory \TEST involved confirming the operation, advancing the tape to the proper seg-

ment, selecting the files with a wildcard designation, and hitting the Return key. The files are displayed on-screen as they are restored.

The *Fastback* software allows you to call an entire or partial directory listing. The system operates fairly slowly and extremely noisy while undertaking this process. While there are a number of options for listing the directory in various formats, the system has no built-in pause feature. You need to use the Ctrl-S or Ctrl-Num-Lock key combinations in order to stop the screens from rolling by. If you wish to exit the module, hitting Ctrl-Break will work.

The default directory listing is in the wide format with five files across, no date and time, no size, and no attributes. The partial directory supplies the root directory listing in the wide mode. After that, it offers the available modes (wide or standard) and directory options (next directory or the current one again). Once the mode is chosen, it becomes the default for as long as the program is being executed. The choices are picked up immediately; there is no need to hit the Return key. The standard directory listing includes the file's attributes (archive, hidden, system, and read only). The date is given with a four-digit year. The listing begins with the description of the backup session, the path, and its level.

The search segment function offers four options. You can designate the pathname, the date, /E for the end of tape, or /Q for all segments sequentially. You can use only the first two options with file-by-file segments. The last option is the only method that you can use for finding image backups. Once the program finds the segment requested, it pauses and asks whether you wish to continue to next segment or escape to menu. When appending backups, you should use the /E option.

While not typeset, the Lintec manual is one of the most comprehensive I've seen. Over 20 pages are devoted to the technical details of the tape drive and the controller card. There's no index, but the table of contents is so detailed, you can get by.

Except for the lack of a door or guides for tape insertion, the Lintec LJ-60685 is a respectable and competitive tape subsystem worthy of your consideration.

—Vincent Pugila

## GENOA GALAXY EXTERNAL TAPE BACKUP SUBSYSTEM, 3200 SERIES (3260)

The Genoa Galaxy External Tape Backup Subsystem, 3200 Series (3260), has an enormous appetite for files. Each DC600A standard tape cartridge can back up 60 megabytes of data, either file by file or as an image backup, including any or all files in a non-DOS partition of your fixed disk. Image backup can be restored to any hard disk of equal partition size to the original drive, and file-by-file backup can be restored to any fixed or floppy disk or RAM-disk.

The \$24-per-backed-up-megabyte price of the Galaxy 3260 system will be difficult to beat. For your money, you get a PC-style subsystem; the connector and power cables; a half-size card compatible with the PC, XT, and AT; two software disks; and a manual that will not draw raves from anyone. The card is available separately for \$329, so you could install one in each of six 10-megabyte hard disk machines and use the single Galaxy 3260 to back them all up once a week using a single cartridge. The economical user will relish the fact that you can perform multiple backups in multiple segments of the tape, each its own logical volume, and that a backup session can span more than a single tape.

As veterans of tape backup systems tell the tale, "It's all in the software," and this is where the Genoa system really struts its stuff. The screen display and menu system are among the finest I've seen, both with regard to functionality and user friendliness. For example, installation of the software is automatic, requiring just four keystrokes, but you can perform the process yourself if you wish to manually control installation parameters, such as selecting the DMA channel.

The Galaxy 3260 software will be appreciated equally by a power user and a first-time user because of its dual modes of operation: menu and batch. The menu-driven mode requires almost no knowledge of the program or the tape system, and its options can easily be run by most users without double-checking the manual. In the event that you don't understand

one of the program's prompts, you can call up a window of good on-line help, with each section including just the kind of examples you want to see. And if you make a mistake by inputting the wrong parameter, there is always a function key to back up to the previous prompt and another to abort the operation.

The menu window presents you with all the choices for the current prompt, and the status window displays the commands and parameters you have chosen in a list. The program moves the highlight bar through the list during execution, so you are never left in the dark, wondering what the system is doing. Another convenient feature of the display: The top of the screen lists the number of files selected for the current backup operation, as well as counting off the successfully backed-up files. And during image backup, the system displays a timer/percentage-remaining bar so that you

can accurately time a coffee break.

There are two command menus. The main menu lists the major backup and restore procedures; the secondary functions of retensioning, erasing, and certifying the tape, performing diagnostics on the tape drive, modifying the setup parameters, and installing the software.

From the menu, you can display a directory of files from any tape segment (as well as a directory of the segments themselves), including subdirectory files, and



### F A C T F I L E

#### Genoa Galaxy External Tape Backup Subsystem, 3200 Series (3260)

Genoa Systems Corp.

73 E. Trimble Rd.

San Jose, CA 95131

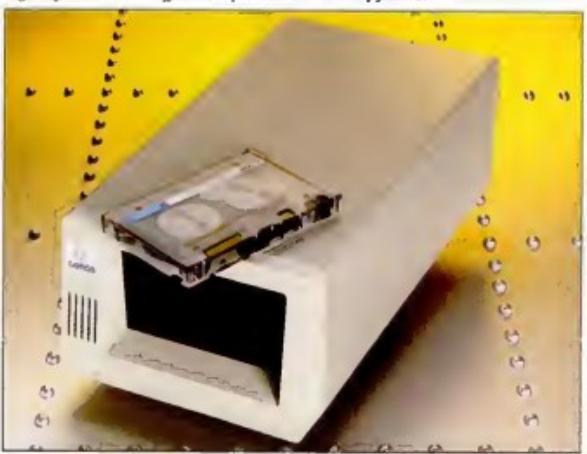
(408) 945-9720

List Price: \$1,400

Requires: 256K RAM, DOS 2.0 or later or PCnet or 3Com.

CIRCLE 896 ON READER SERVICE CARD

**GENOA** Systems Corp.'s Galaxy 3260 system is an inexpensive tape backup entry that features some of the best software on the market. Offering both menu and batch modes of operation, the software provides the user with both a high degree of friendliness and a high degree of control. It also offers a comprehensive on-line help feature.



## ■ TAPE BACKUP

specify a date range for the ones you want to see. The directory can be displayed like a DOS file list, in wide format, or as a tree structure. Very handy.

The Galaxy 3260 can also be run in batch mode—actually, there are two batch modes, automatic and manual. Using the automatic batch mode, you can preset which days of the week you will back up, at which times during the day, and which files will be included. So you can set an automatic backup of only modified files from Monday through Thursday and set an image backup for Friday. If you are using the computer at the time set for an automatic backup, you won't miss its audio message to stop what you're doing. Of course, you can override the system and abort or postpone the backup.

Manual batch mode is identical except you have to specify all the parameters each time you back up. The options include labeling the tape segment; retensioning tape before the backup; halting tape at the end of the backup; backing up files that have been changed within a date range, including subdirectories and excluding particular files; verifying the backed-up files; and printing a hard copy of the operation. Restore options are similar.

As for the Galaxy 3260's reliability and durability, I sensed no problems in the lab tests. Data transfer to and from the tape is fast and, as far as our tests showed, accurate. Genoa's engineers bragged about the durable construction of the unit. So, once they left the office, I decided to prove it to myself. During a restore operation, I lifted the front of the tape drive unit about an inch and let it drop to the workbench. The tape kept spinning despite the sudden shock. Then I tried about 2 inches and still no problem. On my third try from about 3 inches off the workbench, I succeeded in stopping the drive motor and the restore operation. The message on-screen said "Tape Read Error. (A)abort or (R)etry." I pressed R, the tape drive restarted its motor, and the restore procedure continued successfully.

What more can I say? The Genoa Galaxy 3260 works superbly, even when you kick it in the teeth. I would buy this unit if I had one or more large fixed disks to back up frequently, and I would brag about its operation.—Phil Wiswell

## GENOA GALAXY EXTERNAL TAPE BACKUP SUBSYSTEM, 3200 SERIES (3220T)

Some tape subsystems back up and restore disk images quickly; others have file-by-file operations with a lot of flexibility. The 3220T, included in the Genoa Galaxy External Tape Backup Subsystem, 3200 series, offers both. You can also restore selected files to any directory from a disk image. All of this comes with a menu-driven program that offers easy access to all the features, a DOS toggle, and on-line help.

Installing the Galaxy 3220T consists of plugging in the card, connecting the cable, slipping in a data cassette, and running the software installation program (note: While the controller card is smaller than a full-length card, it does not fit into the leftmost slot). The installation program copies the appropriate files into a subdirectory on the hard disk but neglects to include a path to it.

The menu-driven software can be used with any of Genoa's 3200 series tape units. Its main menu accesses the backup and restore features and the tape directory. The

secondary menu provides access to the "logfile," the installation procedure, and a number of tape utilities, such as retensioning, certifying, and erasing the tape.

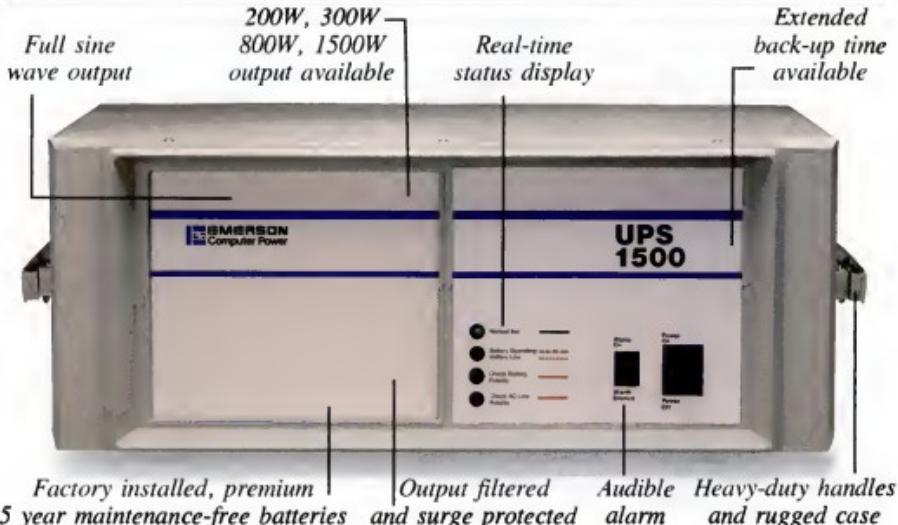
The Galaxy 3220T permits file-by-file and DOS-partition image backup and restore. Each operation is assigned a segment number on the tape that enables you to dictate which backup segment will be used on any given restore. However, while you can obtain a directory of any segment, each must be requested separately. In the actual backup or restore process, you identify the source, the files, the target, and any options. For example, when testing the restore feature, I identified the source as segment 2, the files as C:\TEST\\*,\*, the target as the original path (the default), and the option as /V for verify.

When performing a disk-image backup, the program displays the percentage completed; when backing up individual files, it displays the number of files to be

**SOFTWARE** makes the machine. Nowhere is this more true than in the case of the Genoa Galaxy series units, whose menus are visually pleasing and self-explanatory.



# "Power Protection"



## Announcing: AP1000 Series UPS Full sine wave UPS for low power applications from Emerson, the Technology and Price Leader in Uninterruptible Power Systems

Y our electronic equipment depends upon clean uninterrupted power. If that power is disturbed by "Black-outs", "Brown-outs", Spikes or Surges, your equipment could be damaged and memory lost. Your valuable system becomes worthless.

### Do you have these?

P.C.'s, office computers, ATM's, PBX's, Point of Sale Terminals, Security Systems, or Test Equipment. They could be vulnerable to power-line disturbances.

Now they can be economically protected with the new Emerson AP1000 Series UPS with power ratings from 200-1500 watts and starting at \$379. From 200VA to 4,000 KVA, Emerson has you covered.

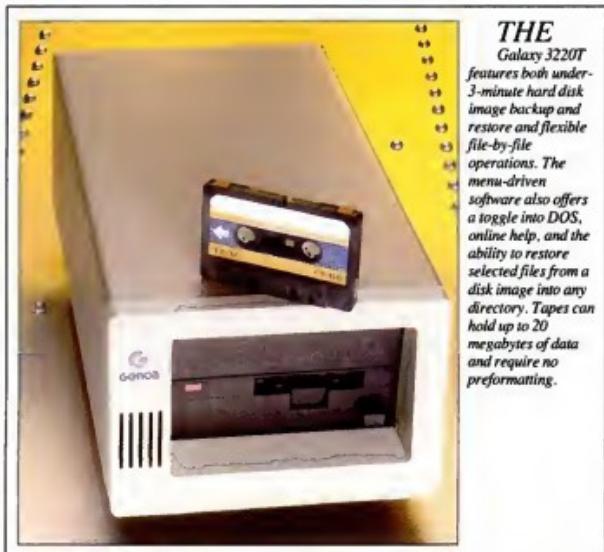
For a free Technical Brochure and the Distributor/Dealer nearest you, call toll free 1-800-BACK-UPS. Emerson Computer Power, 3300 S. Standard St., Santa Ana, California 92702.

CALL  
**1-800-BACK-UPS**  
For Your Free  
Technical  
Brochure



**EMERSON**  
Computer Power

## ■ TAPE BACKUP



**THE**  
*Galaxy 3220T features both under-3-minute hard disk image backup and restore and flexible file-by-file operations. The menu-driven software also offers a toggle into DOS, online help, and the ability to restore selected files from a disk image into any directory. Tapes can hold up to 20 megabytes of data and require no preformatting.*

operated on and the number completed. Backing up an 8.7-megabyte test file of data took 0.33 minutes per megabyte. Restoring the disk image was accomplished quickly.

Backup and restore operations include such options as the ability to exclude selected files, include subdirectory files, back up modified files only, print a hard copy of the transaction, verify files, overwrite files on the hard disk when restoring, and halting the tape at the end of operation. This latter option lets you access the segments for later processing much faster. The system software also allows you to set your own default options so that anyone can perform an operation simply by hitting the Return key a few times.

Once an operation is selected from the main menu, the program divides the screen into three windows. The rightmost one displays the status of the operation, displaying the command and any options being executed, the source and destination, and the various stages of the operation. The bottom of the left window is reserved for the actual names of files being

**PC**  
**MAGAZINE**

### FACT FILE

Genos Galaxy External Tape Backup Subsystem, 3200 Series  
(3220T)  
Genos Systems Corp.  
73 E. Trimble Rd.  
San Jose, CA 95131  
(408) 945-9720

List Price: \$1,095; additional card, \$179  
Requires 256K RAM, DOS 2.0 or later.

CIRCLE 666 ON READER SERVICE CARD

processed. The upper portion displays the segment, the date and time when backed up, the label, the number of files backed up or restored, and the total number of fields to be operated on.

Because the Galaxy 3220T uses the QIC-24 format, no preformatting is required. Files are automatically backed up a block at a time, and each new operation is simply appended to the last. The use of a read-after-write correction scheme is standard; if the system encounters a read error, it repeats the process 16 times. If the error

persists, that section of tape is labeled bad.

Another of the software's features is the logfile. Each time you perform an operation, the program writes it to a file on the hard disk. In this way, you can view a log of the day's tape operations. The first screen level shows the type of operation, date, time, and label. The second level displays the names of files backed up or restored, the tape segment working path, and any options used.

The Galaxy 3220T also comes with a number of tape utilities. The diagnostics test for status control, start/stop, and streaming functionality. Tape erasure takes approximately 2 minutes; certifying the tape, which involves writing and reading some 41,400 records, takes another 5 minutes. Tape retensioning, which is not necessary with the TEAC cassettes, takes another 2 minutes.

The manual, while fairly complete, is difficult to follow because of its poor reproduction. The screen illustrations are especially difficult to read; actual screen shots would have been far more effective. Examples of menu operations are offered, but none are provided for the use of batch commands. On the positive side, the manual states which DMA channel (2) and interrupt (2) the subsystem uses.

The best is yet to come, though. Genos also supplied *PC Magazine* with a pre-release version of its next update. It includes enhancements that truly bring tape backup one step closer to perfection. Some of the enhancements are simply frills, such as the ability to change the date and time within the program and a one-key installation option that appears when the program is booted from a floppy. Others are extremely functional enhancements, such as the ability to continue a backup onto multiple tapes if the end of media is detected and to program an automatic backup schedule. In addition to the DOS-partition image backup, the new version will back up non-DOS partitions, such as those used for XENIX or CP/M. You will also be able to sort directories by name, date, and size, allowing for greater flexibility.

The Galaxy 3220T is definitely a system for both novices and advanced users. It offers the flexibility and ease most people are looking for at a reasonable price.

—Vincent Puglia

## TECMAR QIC-60H

If you like to be kept informed of what your tape backup unit is doing, you'll love the Tecmar QIC-60H. This system has a large display on the front of the tape unit that tells you which track of the tape it is working on and which functions (read, write, or rewind) are being performed at any instant. This impressive flashing display of lights and numbers makes you feel like you got something for your money, which is reassuring, because at \$2,144, this was the most expensive system we reviewed.

The Tecmar hardware is visually appealing and well designed. The system uses the standard DC 600A cartridges, which can hold 60 megabytes of data. The cartridges insert easily and lock in place automatically. The tape unit contains a fan that can be heard over the PC's own fan, but forced cooling should theoretically increase the life of the system's electronics.

The Tecmar cabinet is a perfect match for the PC, and it sits compactly at its side. The QIC-60H is less than 4 inches wide and 7 inches high. The same cabinet is used for a version of the QIC-60H that combines an integral hard disk with the tape backup mechanism. However, the tape unit cannot be upgraded with a hard disk because of different arrangements of the tape electronics in the two units. The cable that connects the QIC-60H and the PC uses high-quality shielded cable connectors. You can buy extra circuit cards so that you can move the tape machine between different PCs, but the stiff shielded cable and firmly mating connectors don't encourage frequent disconnection and reconnection.

Tecmar's tape systems can give you both mirror-image and file-by-file backups and has a full set of features that operate flawlessly. Installing the QIC-60H consists of inserting one circuit board into an expansion slot of the PC, connecting the cables, putting the Tecmar disk in the A: drive, and typing INSTALL. In about 3 minutes, Tecmar's program builds a new subdirectory on your hard disk, containing the software you need to perform disk backups and restores.



### GOOD

*design and visual appeal mark the Tecmar QIC-60H tape backup system. Capable of backing up to 60 megabytes of data onto one cartridge, this unit features an external display that tells you which track of the tape it is working on and which tape function it is performing. The software's exceptional on-line help includes a unique glossary of tape and disk terminology.*



### F A C T   F I L E

#### Tecmar QIC-60H

Tecmar Inc.  
6225 Cochran Rd.  
Solon, OH 44139-3377  
(216) 349-1009  
List Price: \$2,144  
Requires: 192K RAM

CIRCLE 804 ON READER SERVICE CARD

Tecmar's software is remarkable for its on-line help. The help screens even include an on-line glossary of terms specific to tape and disk systems—the first I've seen. This help is particularly useful if backing up files isn't something you do every week or if different people in the office sometimes back up files.

The tape control program makes good use of the PC's screen and special function keys. If your PC is equipped for color, the program will give you a pleasant blue-and-gold screen display with uncluttered menus that clearly describe the choice be-

tween a mirror-image backup and a file-by-file save. It lets you save only a file, a subdirectory, or the entire disk. Similarly, you can restore data the same way if it was saved in the file-by-file mode.

If you would like to further automate the backup process, Tecmar's manual describes commands for use in other programs or in batch files to make use of the tape system. The only way this system can be programmed to perform backups at a specific time of day or day of the week is to include these commands in a program written in BASIC or some other language. The extra programming code would have to do the work of checking the time, date, or other conditions before initiating a tape action with the Tecmar commands.

The QIC-60H took 0.79 minutes per megabyte to make an exact mirror-image copy of all of the data on the disk. Much of this time was used by the machine to position the tape, so if the mirror image is made after some other tape functions have been performed (such as backing up a subdirectory), the system could have made the image backup in about half the time.

# If you don't have data worth preserving, then the reasons for buying Cartrex's new 1/4-inch, high performance, virtually error-free tape cartridge won't mean anything

But, if you are one of the many 1/4-inch tape cartridge users that assume 3M's cartridges just *have* to be "good enough" for today's high performance tape drives, read these simple facts to understand why that isn't true anymore.

PILOTS HAVE A SAYING, "There are those who have made a wheels-up landing—and those who will."

You can apply this expression to those who have lost data and those who will. Unfortunately, data loss isn't always because users haven't backed-up their hard disk.

Sometimes it's because their 1/4-inch tape cartridge, where they back up their hard disk, developed hard errors—those insidious errors that tend to increase over time. That's why Cartrex has developed a 1/4-inch data cartridge for today's high performance drives that virtually eliminates errors.

#### Why a new cartridge

When 3M announced its cartridge in 1971, it was designed for a low capacity tape drive with less than 3 megabytes—2.88 to be exact. The tape was low in density—1600 bits per inch with only 4 tracks and 300 feet of tape.

The tolerances required for the tape drives of the early 1970's were fine for then, but today's tape drives require much tighter tolerance. Today's tape cartridges must work with drives that have 9 or more tracks and bit densities as high as 12,000 bits per inch on 600 feet of tape. That means capacity increases of 2,000 percent packed into the same cartridge.

The reasons that yesterday's cartridge technology simply won't work properly in today's high capacity drives is inherent in the cartridge design.



The new Cartrex 1/4-inch tape cartridge is the first new tape cartridge design in almost a decade and a half. Tape drive manufacturers now have a new cartridge technology which allows them to advance beyond this previous artificial barrier.

With the significant increases in capacity, the three culprits that make cartridge tolerances so important are fluctuating tape tension, redeposit nodules, and instantaneous speed variations (or ISV).

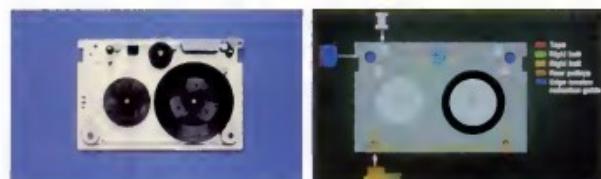
#### Tape Tension

Any child who has played with a magnet understands that as the magnet is separated from metal, the magnet's ability to work is decreased. So

it's no surprise to find out that the closer the tape drive head is to the tape, the better the reading. This closeness is particularly important when the embedded iron filings get packed tighter in today's high density tape.

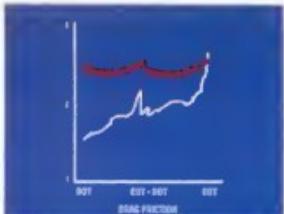
It's also important with the increase in the number of tracks. After all, you wouldn't want the head to be reading an adjacent track any more than you'd want it reading more than one magnetic representation of a bit.

Unfortunately, tape tension historically has not been constant. As the tape unwound, the tension increased. What's important is both the amount and range of tension. A fluctuating increase or decrease in tension is as unacceptable as low tension is in the first place. As the accompanying graphs



The Cartrex cartridge design (upper left) uses the N2 principle which creates head-to-tape tension by applying a mechanical differential at the rear pulley between a stiff transport belt and a stiff tensioning belt, indicated in green and yellow in the color schematic (upper right).

The conventional 3M design applies drag at the rear pulley to create tension, which creates heat, and limits future speeds much above 90 inches per second.



*Good head-to-tape tension ensures the highest probability of reliably capturing data. Fluctuating tape tension allows data loss due to head-to-tape separation and smearing redeposit nodules across the tape head. The Cartrex cartridge, compared to the conventional design, creates constant and higher tension.*

show, the Cartrex cartridge has higher tension and flatter profile than the 3M cartridge. This means more reliable data across the entire tape.

#### Redeposit Nodules

Another reason to keep constant tension is to avoid "redeposit nodules" from smearing across your tape drive's head. What are redeposit nodules? They are the insidious flakes of tape media that break off from the edges of the tape and get dragged up to the edge of the tape head. If the tension is low, or becomes low when the tape starts or reverses, the flakes come up over the edge, get smeared over the head, and reduce its ability to read the data.

Even worse, however, is that these redeposit nodules are dragged along the surface of the tape and get embedded and packed over time. When your drive tries to read the data, the redeposit nodules act as a tent pole holding up the tape away from the head. As a result, even the best error-recognition algorithm can only tell you one thing—you've lost the data.

You might be wondering what causes the flaking in the first place. Again, it is cartridge design. The basic design uses a tape guide, shown in the accompanying illustration. The problem with this approach, is that it presupposes that the tape will always run parallel to the top and bottom caps of the tape guides. At the low speeds of

30 inches per second typical of when the 3M cartridge was designed, it was less of a problem. But at today's speeds of 90 inches per second and more, the tape wanders. When it presses against the top of the tape guide, the tape's edge pressure builds. Not only does media flake off, but you lose data due to the "coining" or "scalloping" effect.

Cartrex eliminated the cause of the tape coining or scalloping by developing a barrel-shaped roller placed prior to the tape guide. The laws of physics show that by riding on a rounded barrel, the tape will always seek the middle, reducing the tape edge pressure. This seemingly simple addition causes the tape to always enter the tape guide with zero edge pressure. In this way, the possibility of media flaking off and creating redeposit nodules is virtually eliminated.

#### Instantaneous Speed Variation (ISV)

Instantaneous speed variations is exactly what it sounds like—small, instantaneous changes in tape speed as it crosses the tape head. At slow tape



*You can compare the Cartrex design on top with the conventional 3M design (lower left) and DEL 4 license (lower right). The omission of "edge tension reduction guides" (indicated in dark blue on the color schematic) on either the 3M or DEL design means that tape edge pressures will increase causing the magnetic media to flake off, smear across the tape head, and cause "redeposit nodules" to become embedded in the tape.*

speeds and low bit densities—like the 1971 standard of 30 inches per second and 1,600 bits per inch—ISV wasn't as big a problem. At that time, the bits were crossing the head at 48,000 bits per second.

Today, however, the story has changed. 90 inches per second and 8,000 bits per inch mean that 720,000

bits cross the head every second. A 1,500% increase.

As you may have guessed, speed fluctuations in the 48,000 bits per second made reading data difficult for tape drive electronics. But when the electronics have to guess whether or not the bit rate of 720,000 bits per second is accurate, the electronics can become overwhelmed.



*High speed tape without the "edge pressure reduction guide" seldom enters tape guides parallel to the top and bottom. The edge pressure which results creates "scalloping" or "coining" on the tape. The effect is data loss due to head-to-tape separation, flaking media that smears across the head, and "redeposit nodules" that create hard errors.*

#### Never a Single Issue

Your tape drive seldom has the luxury of dealing with an isolated problem. It's usually a combination of ISV, redeposit nodules, and tension problems all together. Now you understand why Cartrex wanted to develop a cartridge for a market that needed a modern alternative.

#### Where to get it

Not only has Cartrex improved on the industry's 15 year old technology, they have done it for a competitive price.

Now you can have peace of mind when you back up your hard disk on today's sophisticated tape drives.

And you can have it fast. Simply phone:

**(619) 485-6603 EXT 100**

and give Cartrex your credit card number and they will send your cartridges by return mail.



CARTREX  
CORPORATION  
MARKETING  
HEADQUARTERS

11590 WEST  
BERNARDO CT.  
SUITE 230  
SAN DIEGO,  
CALIFORNIA  
92127

619-485-6603

**CARTREX**

CIRCLE 525 ON READER SERVICE CARD

## ■ TAPE BACKUP

The Tecmar mirror-image program must restore data to a disk with the same size and format configuration as the disk it took the data from. It can, however, reallocate data around bad sectors on the disk so the restored drive does not have to be the same one from which the mirror image was made. This feature is important because some mirror-image programs are the only insurance against someone's typing FORMAT C: by mistake; the data must go back to the disk from which it came. But the Tecmar QIC-60H system is useful for quickly moving up to 60 megabytes of data between physically different hard disk drives. One important caution: Make sure the versions of DOS are exactly the same if you carry data between machines. Trying to transfer between machines with different versions of DOS with a tape system can result in a total loss of information.

The tape utilities selection on the Tecmar menu allows you to select between retensioning the tape, reading the directories or filenames on it, or erasing it. The program asks you to double-check commands that could lead to the loss of data such as Erase. You can use the tape utility program to search for a particular file or subdirectory on the tape by name, so you don't have to read an entire directory to see if the file you want is in the tape.

Generally, the data-transfer program seems efficient. The data is buffered so that the light on the hard disk doesn't go off and information is sent to the tape in large blocks that keep the starting, stopping, and tape movement to a minimum. The display on the front of the tape unit tells you what the drive mechanism is doing, and messages on the screen give you a blow-by-blow description of what the program is doing. Filenames scroll by as they are copied, so you have a good feeling that the backup is successful and that it actually includes the files you meant to specify.

Certainly, less expensive tape backup systems are on the market. But the Tecmar system just doesn't have any glitches. The software will do anything you need from making fast mirror images to restoring a single file. Only a clock/calendar interface is missing, and that can be supplied by an outside program. The hardware is well designed and good-looking. You get what you pay for.—Frank J. Derfler, Jr.

## MAYNARD'S MAYNSTREAM 20

The MaynStream 20 is a 20-megabyte portable tape backup system whose basic design and principal advantage hinge on the borrowed motto: "Have data, will travel." The handsome cassette unit—not much larger or heavier than a library cardfile drawer—is equipped with a carrying handle to facilitate shuttling the MaynStream between multiple computers. If you have 20 different hard disks, you can back them up with one MaynStream and a supply of tapes. It's an extremely versatile machine.

The system is composed of the cassette unit, an ultrashort card that fits any slot, a cable connector, one disk, one cassette tape, and a masterfully produced manual that actually has photographs of the components. Hardware installation is simple and well documented, requiring no more than 5 minutes. All you do is open your system unit, snap the 3-inch-long board into any open slot, plug in the connector

and the power cables, and power up.

Software installation is equally straightforward, and most users should be backing up their first files within 10 minutes of opening the carton. After making a backup copy of the program disk, you simply type INSTALL. Two minutes later, you can begin using the MaynStream in any of its three operating modes, all three of which



### FACT FILE

#### The MaynStream 20

Maynard Electronics  
430 E. Semoran Blvd.  
Casselberry, FL 32707  
(305) 331-6402

List Price: \$1,595

Requires: 128K RAM (256K recommended), DOS 2.0 or later.

CIRCLE 708 ON READER SERVICE CARD



**HAVE**  
*data, will travel—that's the motto of the Maynard MaynStream 20 system. The cardfile-sized unit is packaged for portability and includes an ultrashort interface card, a single disk of software, and a handy carrying handle so you can shuttle the unit between a veritable fleet of hard disks.*

## ■ TAPE BACKUP

are useful to many working environments.

The first operating mode is called the "automatic backup system," activated by typing the command **SAVE**. The screen clears, and the single question "Do you wish to back up your entire disk drive?" appears along with the "No" and "Yes" choices. Backing up your hard disk drive requires no more than highlighting the "Yes" option and pressing **Enter**. In the lab, the MaynStream 20 backed up our 8.9-megabyte test file in a fast 2.11 minutes per megabyte. The system does not offer a fast image backup, but I will be hard pressed to think of another criticism.

The second operating mode is called the "menu system," activated by typing **TMENU**, which offers seven options: Backup, Restore, Verify, Dir, Tension, Erase, and Quit. As you highlight a command with the cursor, an explanation of its function appears on the line beneath; few users will feel the need to refer to the manual. Pressing **Enter** selects an option.

The **Backup** option will back up an entire disk drive, floppy or fixed; the menu displays your drive letters for you to select by highlighting. And look Ma, no formatting! You just insert the tape and start backing up without the usual 40-minute delay to format it. The **Restore** option is the reverse of **Backup**. It prompts you for the drive to which you want the entire contents of a tape copied. The MaynStream allows you to back up and restore non-DOS partitions on your hard disk, but only when it detects the partition does it ask whether or not you want to back up or restore it.

The **Tension** option is an automatic procedure that retensions the tape to protect reliability; Maynard recommends using the option after every 20 backups on the same tape. The MaynStream allows you to overwrite existing data on the tape, but if you want to make sure certain information disappears from the tape, you can use the **Erase** option. The last command on the menu other than **Quit** is **Verify**, which verifies that all data from a particular drive has been backed up reliably on the tape.

The final mode of operation, called the "advanced command structure," offers all the functions of the other two modes under much more flexible control. For example, you might back up your *I-2-3* worksheets with the command **TBACKUP**

# A nnouncing a complete internal half-high 60 megabyte tape backup system for your IBM PC, XT, or AT that backs up your hard disk automatically for only \$995

**E**xpress Systems' AutoBak™ software will back-up your hard disk by image or file-by-file. And it will let you tell it to back-up automatically by date, time, extension, subdirectories, or everything since you last backed up.



For an additional \$250 you can own either the Express Systems half-high or full-height subsystems. Each subsystem comes with its own power supply and room for a hard disk—also available from Express Systems.

### Tape Systems and Subsystems

Formatted Storage Capacity	Height	Data Transfer Rate (k/sec)	PC or PC XT	AT
60 Mbytes	5½"	88	\$ 995	\$ 995
60 Mbytes Subsystem	8"	88	\$ 1,245	\$ 1,245
26 Mbytes Floppy Tape® Subsystem	3½"	31	\$ 749	\$ 749

### Why back-up automatically?

Let's face it, when was the last time you rushed off before putting something away or cleaning up your desk? Well, a sloppy desk is one thing, but failing to back-up your hard disk can be quite another. That's why Express Systems created AutoBak.™ This new software lets you forget about protecting one of your business's greatest assets—the information stored on your hard disk—and takes on the responsibility for you.

### IBM Compatible tape drive system complete for \$995

The Express Systems™ tape drive comes complete—half-high tape drive, controller, and software—for only \$995. It's absolutely IBM compatible—all 60 megabytes of it.

You can use your tape drive in the event your hard disk fails. And if you have to replace your hard disk, the tape's ability to read bad sectors will let you replace your hard disk with another even if the new one is not error-free. The tape requires very low power, too.

And it doesn't take along. It reads and writes at 90 inches per second (ips) and transfers data at up to 5 megabytes per minute in the streaming mode. You don't have to be a rocket scientist to

figure that you can perform an image backup of a 20 megabyte hard disk in about 4 minutes. But practically speaking, once you back up your hard disk completely for the first time, you never need to do more than invoke the archive command—that convenient command that tells your new tape drive to backup everything since you last backed up. If you back up as often as you should, your Express Systems tape drive will finish the job virtually in seconds.

### Easy to install

Before you get intimidated about installing our tape drive internally, you should understand that IBM doesn't think it's too hard. They're selling IBM PC AT's with instructions on how to add additional hard disks in the *Installation and Setup* manual that comes with the AT. Our instructions for installing your new Express Systems tape drive follow IBM's clear, simple instructions.

### How to order

Pick up the telephone and call 1-800-341-7549 Ext. 2300 to order. We accept Master Card, VISA, American Express and Diners Club.



# XPRESS

Call Toll Free 1-800-341-7549 Ext. 2200  
In Illinois call (312) 882-7733 Ext. 2200

Express Systems, Inc. 1254 Remington, Schaumburg, IL 60095

IBM® is a registered trade mark of the International Business Machines Corporation.

Express Systems and AutoBak are trademarks of Express Systems, Inc.

CIRCLE 383 ON READER SERVICE CARD

# Announcing the 20 Megabyte Express Hard Disk Card™ for only \$595

**C**omes complete with everything you need, installs in minutes, and has a 1 to 1 interleave factor. For an extra \$95 you can add it to an existing hard disk and have both disks act as one volume.



## Easy Installation

If you're someone who hates reading installation manuals, doesn't understand directions, or who gets intimidated installing internal disk drives, then the Express Hard Disk Card™ is for you. Simply insert it inside your IBM® PC, PC XT, or compatible, like any other add-on card.

## High Performance

The Hard Disk Card gives you 20 megabytes—and something more. The Controller comes with a 1 to 1 interleave factor, which means that you retrieve data 6 times faster than the PC XT's 6-to-1 interleave controller.

Express Systems, Express Hard Disk Card and Coalesce are Trade Marks of Express Systems, Inc. Coalesce requires DOS 3.1

## One File Across Two Hard Disks

With Express Systems' new Coalesce™ Software, you can add our 20 megabyte Hard Disk Card™ to your existing hard disk. They will both work together as though they were one disk—*regardless of their size*. Coalesce not only merges the two hard disks together, it bypasses the DOS barrier of 32 megabytes. That means that if you're using a 32 megabyte hard disk, you can add our Hard Disk Card and have a total of 52 megabytes as a single file!

For the best buy in a convenient, easy to install 20 megabytes of hard disk storage, call Express Systems.

1-800-341-7549

In Illinois, call 1-312-882-7733



CIRCLE 381 ON READER SERVICE CARD

# EXPRESS

Call Toll Free 1-800-341-7549 Ext. 2100  
In Illinois call (312) 882-7733 Ext. 2100

Express Systems, Inc. 1254 Remington, Schaumburg, IL 60195

IBM® is a registered trademark of the International Business Machines Corporation.

## ■ TAPE BACKUP

CALOTUS™ WKS/S/M/A/F. This command translates in English to: Go into the LOTUS directory and back up all files with the extension .WKS, including .WKS files in all subdirectories of LOTUS (S), selecting only files that have been modified since the last backup (M). Append rather than overwrite on the tape (A), and list the files on the screen as they are backed up (F).

Other options allow you to back up all files after a certain date and to back up non-DOS partitions. Wildcards are allowed in both filenames and extensions.

The TRESTORE command has similar flexibility, including the option to be

## I wish I had a

MaynStream 20. It would facilitate house calls to a client's sick hard disk and give me fast, reliable backup in the interim.

prompted before restoring a file that has been changed since the last backup. The TDIR command gives you a directory of files from the type or of any subdirectory from the tape. You can use the Tension option with or without the Erase option. The TVERIFY command and its options compare sections of the tape with those on your hard disk.

I wish I had a MaynStream 20. It would certainly facilitate house calls to a client's sick hard disk and give me fast reliable backup in the interim. And just think how much data a friend could let you siphon from his hard disk in less than half an hour! Of course, each computer using the MaynStream must be equipped with the special controller card, but these are available separately for \$195 each, which means you could protect and maintain a fleet of 20 hard disk machines for a \$5,000 investment. That would make my accountant sleep at night. How about yours?

—Phil Wiswell

## ■ TAPE BACKUP

### SYSGEN QIC-FILE

The most distinctive aspect of the Sysgen QIC-File tape backup system is that it tries to be invisible. Designed to be as unobtrusive as possible, the QIC-File hardware is small and compact, measuring only 2 inches high, 6 inches wide, and 9½ inches deep.

This small box can fit next to or on top of a PC. The long, shielded connecting cable also lets you tuck the tape drive away in the corner of a desk. Such compactness is achieved by putting the power supply in a separate box, which can be located behind the PC. A clever Sysgen designer found a way to keep QIC-File out of sight and mind by giving the power supply a plug that fits into the PC's monochrome monitor power socket. This connection automatically delivers power to the tape system whenever you turn on the PC's big red switch. The QIC-File plug also has a through connection so that you can still plug in the monochrome monitor; a separate pigtail lead is supplied in case you are using a non-IBM computer without the monitor power plug. The interface card inside the PC is a short board requiring one expansion slot.

The QIC-File tape drive has a red power light, but no other indicators. There is no fan, and the sound level of the tape during operation seems lower than that of similar units. Basically, the hardware just sits out of the way and works.

Sysgen's QIC-File uses a standard proven tape media: DC600A 60-megabyte cartridges. PC Magazine Labs tested two QIC-File units. One had a manual lever for locking the tape in place, and the other had an automatic tape latch. Our impression, based on this small sample, is that the automatic latching mechanism worked more smoothly and was less likely to be damaged by forceful handling than the manual one. But this difference is probably subject to the same kind of debate that rages between proponents of top-loading and front-loading VCRs. The bottom line is that they both work.

The software features an automatic utility that keeps track of the date and time and makes backups according to a detailed

**N**ow you can own up to 144 megabytes of hard disk storage—in one file if you like—for as little as \$3,795. That's only \$27 per megabyte.



Complete 72 Mbyte Hard Disk Kits—(all transfer rates 5 Mbits/sec)

Formatted Storage Capacity in Mbytes	Height	Plated Media	Average Access	Comments	PC or PC/XT	AT
72	Full	no	30 msec	Ideal AT drive for LAN	\$2,195	\$1,995
144	Full	no	30 msec	2 72MB drives as one volume	\$3,995	\$3,795

#### Get around the DOS 32 megabyte limit

Until now, if you wanted to store more than the 32 megabyte limitation built into PC DOS, you were out of luck. That is, unless you wanted to try some unreliable device drivers or some outrageous price from a subsystem house.

#### How it works

Express Systems' unique Coalesce™ software not only lets you get around the 32 megabyte limitation—but it lets you add a new hard disk to your current hard disk and have them both act as one disk or volume—even if their combination exceeds 32 megabytes of storage. For example, if you own an XT and want to add more storage, all you have to do is add a half-high hard disk to your current full-height hard disk, and you can treat them both as a single hard disk.

#### 144 Megabyte IBM AT

The IBM® AT, as you know, is available without a hard disk. You can install two of Express Systems' 72 megabyte (for-

Express Systems and Coalesce are Trade Marks of Express Systems, Inc. Coalesce requires DOS 3.1

matted) hard disks at a total cost of \$3,795 (\$3,995 for a PC or XT) and you'll have 144 megabytes of data. You'll also have a fast 30 msec disk, ideal for the new IBM local area network (LAN).

#### You won't outgrow it

You won't outgrow this storage system. As larger hard disks pass our quality assurance program, we'll provide them. You will be able to add or replace their existing hard disks with no problems. How big are these future hard disks? Well, we're looking at a 300 megabyte hard disk right now. That means you could have an IBM AT with 600 mega-

#### Comes with security

Large storage like this needs security. Coalesce comes with it. You can protect the entire disk, or individual volumes—or put different passwords on the 24 separate volumes that Coalesce offers.

So if you want mass storage only affordable by the minis and mainframes, call Express Systems today.



CIRCLE 382 ON READER SERVICE CARD

**EXPRESS**  
SYSTEMS

Call Toll Free 1-800-341-7549 Ext. 2000  
In Illinois call (312) 882-7733 Ext. 2000

Express Systems, Inc., 1254 Remington, Schaumburg, IL 60195

IBM® is a registered trademark of the International Business Machines Corporation.

## ■ TAPE BACKUP

stored schedule. After the initial setup, you may never have to do anything more than insert and remove the tapes: Everything else is automatic.

To install the QIC-File software, simply type A:INSTALL. The installation program writes the needed files on the hard disk and even creates an AUTOEXEC.BAT file to call the automatic backup program. If you have an existing AUTOEXEC.BAT file in the root directory, the installation program will keep what you have and add several new lines of commands to the end.

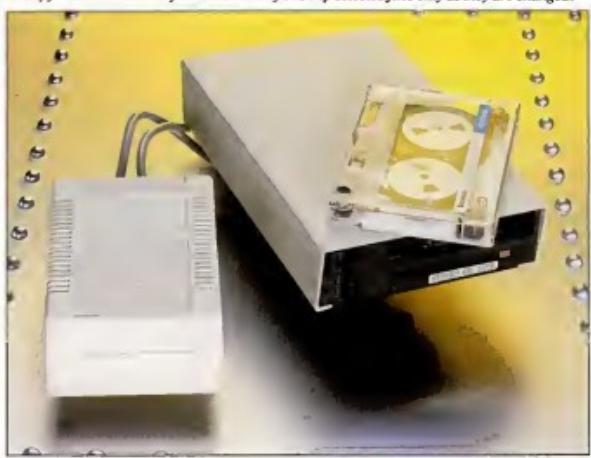
The file backup program puts great emphasis on automating regular backups. This is done through the clock calendar, which can be set to do up to two backups a day every day of the week. Using the graphic calendar display, you can select the times and days for backups and specify which files or directories are to be copied. If you wish, you can have only the files that have been updated since the last backup copied; you can also selectively back up hidden files and subdirectories. Backups can be scheduled at a time when there is little chance of the system's being in use. Also, you can quickly make temporary or permanent changes to the backup schedule from the calendar display.

My only criticism of the automatic backup program is that it is very single-minded. The backup screen pops into view each time you boot up the system. It checks the tape in the unit, and if it doesn't find a tape with the proper identification, it will continue prompting until it does. If you are just using the machine casually and don't need the tape system, you have to use the Esc key to get rid of the program, but this isn't suggested on the screen. People who don't instinctively reach for the Esc key could be frustrated by this program's persistence. Some sort of "Don't bother me now" option would be nice.

A semiautomated program is available to help you restore files. The restoration program shows you a directory of the tape and asks you to select those files or subsets you want to restore. You can use normal DOS wildcards to reply, so \*. \* will restore all of the files in any directory, while \*.DAT will only start the program looking for the files with that extension.

Of course, all of this automatic-pilot

**SYSGEN** Inc.'s Syxgen QIC-File performs its backup chores unobtrusively. Compact and quiet, the QIC-File's software is written with automation in mind, although you can take matters into your own hands for a maximum of control. High on this system's list of handy features is the ability to automatically back up selected files only as they are changed.



### F A C T F I L E

**Syxgen QIC-File**  
Syxgen Inc.  
47853 Warm Springs Blvd.  
Fremont, CA 94539  
(415) 490-6770  
**List Price:** \$1,495  
**Requires:** 192K RAM

CIRCLE #891 ON READER SERVICE CARD

operation is great for ensuring that the job gets done, but there are times when you want to guide the system yourself. The QIC-File system includes several programs that can perform mirror-image or file-by-file operations under your close control. The image-backup and file-backup programs each have a prompted and command-driven mode. The prompted mode isn't fancy, but it presents simple questions that help to configure the program to your specifications. The command mode can be used to issue .BAT file instructions or to call the tape programs from another program. A number of func-

tions and parameters can be linked on one DOS command line so that the program knows what to do when it starts up. These file and tape management programs work efficiently, but tapes created in this mode cannot be used with the automated software. The automated programs apparently do not examine the tape closely enough to see the options you may have used in manual mode, and they might write over existing data.

QIC-File's automated mode of operation is the way the system is designed to be used. But both the automated and manual modes give you a full range of capabilities for file-by-file or mirror-image backups and restorations.

Backing up data is a chore that requires discipline, and probably nothing is so disciplined as an automated program. Syxgen's QIC-File is uniquely designed to automate the backup process while imposing an absolutely minimal burden on you. By selectively backing up significant files only when they are changed, it could be a long time before you have to replace the 60-megabyte tape.

—Frank J. Derfler, Jr.

# Get Networking. MultiMate Advantage.

The word processing key to office integration.

Multimate knows the needs of today's effective office. And Multimate has the products to bridge the office productivity gap.



## multimate advantage

*Don't get lost in the translation.*  
File conversions. ASCII, of course.  
DIF for spreadsheets. COMM for  
data communication. DCA to  
tap IBM® host computers  
and Displaywriters. WPS for  
WANG®. All this and more with  
MultiMate Advantage.



Cross the  
integration barrier.  
MultiMate Business  
Advantage Communications Board. Direct  
document exchange from  
MultiMate to WANG OIS  
or VS and back. Switchable  
asynchronous/bisynchronous  
mode for communications  
with other hardware, too.

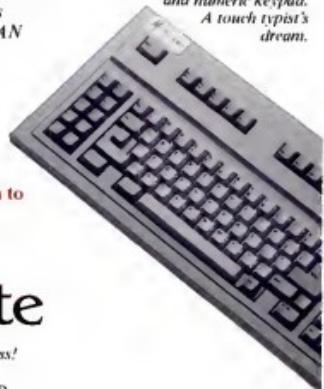
*The write connections.*  
MultiMate Advantage Local Area  
Network Versions. Professional  
word processing at every work  
station. Electronic file sharing.  
Centralized printing. No  
duplication of resources. Versions  
for IBM® PC Network, 3Com®,  
and Novell NetWare/86®. Plus a  
universal version that works  
on most other networks. LAN  
versions also available for  
MultiMate 3.3 Series.

Ask your computer  
products dealer for a  
demonstration.  
If he doesn't have it tell him to  
call us!

*Don't just get by.*  
Get MultiMate Advantage™. America's  
corporate choice for professional  
word processing. Power you  
thought could only be  
found in dedicated word  
processors. State-of-the-art  
features you want most.  
All in one easy-to-use  
product.

*Don't be key-bored.*  
MultiMate Business  
Advantage Keyboard.  
Features of dedicated word  
processing keyboards for your  
PC. Programmable function  
keys. Separate cursor controls  
and numeric keypad.  
A touch typist's  
dream.

**Multimate**  
A Subsidiary of Adtran-Lex  
*We're in the write business!*



MultiMate Advantage is designed for the IBM® Personal Computer, XT, AT and plug-compatible computers with a minimum of 320K memory.

MultiMate is a registered trademark and MultiMate Advantage™ is a trademark of Multimate International. IBM is a registered trademark of International Business Machines Corporation which developed DCA. DCA was developed by Software Arts Inc. WANG is a registered trademark of Wang Laboratories Inc. which developed WPS.

## CIPHER'S 5210 FLOPPYTape BACKUP SYSTEM

The advertising literature for Cipher's 5210 FloppyTape Backup System promises you a real bargain: \$1,095 buys you the capacity to back up a 10-megabyte hard disk drive onto its FloppyTape format in a rapid 10 minutes. PC Magazine Labs' tests, however, revealed another side to this story.

The 5210 looks like a PC, except that it is about one-third as wide. Getting the hardware going on an XT was a snap, since the drive connects by cable to the XT's floppy disk controller, a system that is also convenient for moving the unit around to different computers. Installing the 5210 on an AT is more difficult, requiring a separate controller card. To insert a tape into the drive, you pull out a tray, slip the tape onto the tray, and push it in. Hit the power switch at the rear of the unit, and off you go.

The 5210's software, which gives you the option of working either from a menu or with commands, is slightly less pleasant to deal with than the hardware. The menu structure is simple and functional, but visually primitive in that it uses no color and the menus are written to the screen slowly, one character at a time. A set of choices appears, each of which takes you to various submenus. The 5210 responds to four commands: FTFORMAT, FTDIR, FTBACKUP, and FRESTORE. Each command can be used with a complex set of parameters and, when appropriate, path and filename specifications.

The Cipher drive does not conform to the QIC-24 tape standard, which requires no tape formatting, but it does format in about 40 minutes—one-third the time of drives that use the common PC/T tape format. Once formatted, a standard  $\frac{1}{4}$ -inch FloppyTape cartridge can receive up to 25 megabytes of information. The software notifies you of any bad sectors that lurk on the tape.

When you are ready to back up your disk, you will find that the menu does not let you do everything that the commands allow. Choosing the Backup Files to Tape option from the main menu takes you to the backup menu, which allows you to

back up the entire disk, a subdirectory, or just those files that have been modified since your last backup. This last option is a real timesaver that should be a standard feature in any software written for backing up hard disks.

We expected the backup operation to take about 10 minutes, as per the manufacturer's claim, but our tests revealed an av-

erage time of 5.92 minutes per megabyte. The claimed time of 10 minutes to back up 10 megabytes is for an unverified backup. If you use the menu to back up your disk, you will always get a more desirable verified backup. If you want to perform the speedier, but less reliable, unverified backup, you have to enter the command

FTBACKUP C:\ /s/x/t

where C:\ refers to the root directory, s refers to subdirectories, x places the names of files on the screen as they are backed up, and t gives the time of the backup.

All of PC Magazine Labs' tests were run with a CONFIG.SYS value of BUFFERS=20. By increasing this value to 75, we were able to speed up unverified backup times somewhat. However, the 5210 documentation suggests a value of 16 for the buffers. A spokesperson for Cipher thought the slow times might be caused by a defective unit, but a switch to a different unit produced no improvement in the times. The Cipher spokesperson then suggested that the problem might be due to a slow drive, a slow hard disk controller, or

**PC MAGAZINE**

### F A C T F I L E

**5210 FloppyTape Backup System**  
Cipher Data Products Inc.  
10101 Old Grove Rd.  
San Diego, CA 92138  
(619) 578-9100  
**List Price:** \$1,095  
**Requires:** 256K RAM, hard disk drive,  
DOS 2.0 or later.  
CIRCLE 688 ON READER SERVICE CARD



### CIPHER

Data Products'  
5210 FloppyTape  
Backup System  
offers 25 megabytes  
of backup capability  
in an easy-to-install  
system. The  
software lets you  
choose between file-  
by-file, image, and  
directory backup  
and can back up only  
those files that have  
been modified since  
your last backup.  
The unit can be  
easily transported  
for use among  
several hard disks.

some combination of both. We checked the drive with the Core benchmark test and found the average access time to be 93 milliseconds. Cipher used high-performance 40-millisecond drives to achieve its times. This might account for the discrepancy in backup times, but 40-millisecond drives are not normally used in an IBM PC-XT. The hard disk controller that we used was also standard XT hardware. It may have slowed performance somewhat, but we were not able to prove this contention one way or the other.

The next PC Magazine Labs test was to append a directory backup to the original backup. When we selected the Directory Backup option, we were informed that the operation erases any data on the tape drive. We did it anyway. If we had used the FTBACKUP command (which is well documented in the user manual) rather than the menu, we could have appended to the end of the original backup.

A file restore from tape to disk works much like a backup. You select Restore from the main menu to bring up the four-choice restore menu. Besides restoring all files or a subdirectory, you can restore files by the date on which they were created, which Cipher calls a "date window" restore.

When the unit has finished backing up your disk, you are notified of any errors that may have occurred. If there are errors, they are designated as either correctable or noncorrectable. Correctable errors can be fully recovered automatically through the system's error-correction scheme, which reserves one 1-Kbyte data sector for error correction information out of every 17 written to tape. If there is more than one error in any given 17K-byte segment, the error is uncorrectable and data must be recovered by retrying the backup one or more times.

Documentation for the drive is thorough and clearly presented. There is some general information on tape backup, information on how to set up your system with AUTOEXEC.BAT and CONFIG.SYS files, an explanation of the menu system and tape commands, and appendixes on error messages and maintenance.

The Cipher 5210 proved to be reliable but slow, which is especially interesting in light of the manufacturer's claims for the

unit. But for those who are more cost conscious than time conscious, the 5210 offers an effective backup for several hundred dollars less than most units. The fact that the tape holds only 25 megabytes is not a real problem since the FTBACKUP program can use more than one tape for a backup if needed. For XT users, the ease of installation is an added dollar-saving bonus, since it could allow the 5210 to be used for backing up several different machines. The drive can't be all things to all people, but it is certainly a viable choice in the tape drive market.—Joe Desposito

## SIGMA DESIGNS' SWS-0060

Sigma Designs' SWS-0060 backs up as much as 60 megabytes of data onto 1/4-inch DC600A cartridges, using the QIC interface. What's interesting about the Sigma drive, however, is its software, whose menu design has taken a page from Lotus's 1-2-3. This familiar user interface makes it a breeze to perform a variety of backup tasks with the Sigma drive.

**MENU** structure for the Sigma Designs SWS-0060 software consists of a series of tape commands and parameters preceded by slashes, much like Lotus's 1-2-3.

```
RCOPY: The intelligent tape structured copy utility. Version 1.00
(C)Copyright Sigma Designs, Inc 1985

usage: RCOPY [/S /M /D /R /C [/I /V]] <source path> <destination path>

Where: /S      Copy subdirectories also.
       /M      Only copy modified files.
       /D      Only copy files w/ later dates.
       /R      Replace (don't remove all) files on destination.
       /C      Clear (remove) all files first.
       /I      Use image transfer.
       /V      Verify after image transfer.
```

The colorful menus are detailed and presented in a consistent and attractive manner. Screens are divided into several sections. The horizontal main menu is called the select menu. The parameter menu is in a vertical column below the select menu. A status box and a menu message area fill out information about the menu choices and show the available function keys. For instance, F1 is help, F10 is select, and so forth. Whenever you need to add parameters, a slash appears on the status line. The choices appear when the Slash key is pressed.

The drive is about one-third as wide as the XT. The case can take a hard disk, which Sigma sells. Hardware setup is easy; just slip the controller card into your XT's short slot, attach the shielded ribbon cable, slip a tape into the opening at the front of the drive, and boot up the software.

The opening screen offers you six menu choices: Backup, Restore, Directory, More, Tutorial, Exit. Choosing Backup changes the row of selections to Options, Files, DOS, Entire Disk, and Quit. At this point, you are ready to begin backing up your hard disk; all you need to do is decide which kind of backup you want.

The SWS-0060 performs both image and file-by-file backups. If you want an

## ■ TAPE BACKUP

### SIGMA

*Designs' SWS-0060's software features a menu structure that resembles Lotus' s popular 1-2-3, making backup tasks a breeze. Using standard 60-megabyte DC600A cartridges, this unit installs easily and allows great flexibility in the kinds of backups it makes. The case has room for a hard disk, which Sigma also sells.*



image backup, you choose between DOS and Entire Disk. The difference between the two is in the kinds of partitions you have on your hard disk. A DOS backup will make an image of a partition that was formatted under DOS. A backup of the entire disk will make an image of all the partitions on the disk, regardless of whether they were formatted under CPM-86, XENIX, or whatever.

The more typical and useful test of a tape drive, however, is its ability to perform a file-by-file verified backup of the disk. On the SWS-0060, you do this by selecting a "verify" parameter from the options menu and then selecting Files. When you are prompted for the filename, you can select an individual file, a subdirectory, or all the files on the disk.

To back up all files on the disk, you enter CN as your filename and then set the program to search for subdirectories. This took PC Magazine Labs 2.96 minutes per megabyte; during this backup period the software keeps you informed of the backup status by indicating the current file and its size. The words *ready, executing*, and



### F A C T F I L E

#### SWS-0060

Sigma Designs Inc.  
2023 O'Toole Ave.  
San Jose, CA 95131  
(408) 943-9480  
List Price: \$1,595  
Requires: 256K RAM

CIRCLE 697 ON READER SERVICE CARD

complete flash for each file.

After backing up all the files, PC Magazine Labs appended a file-by-file subdirectory backup to the original backup. This took nearly as long as a complete backup of all the files, even though the directory was only about one-half the size of the original backup.

To restore the subdirectory to the disk, you simply choose Restore from the main menu and follow the submenus, which are similar to those under Backup.

The Sigma drive also lets you back up only those files that have been modified

since the last time the disk was backed up. To do this, you bring up the criteria section of the backup menu. One of the selections on this menu is file attribute, which apparently instructs the program to check the archive bit. However, this part of the program has not yet been implemented, a recurring problem throughout the menu structure. The software is not 100 percent complete, and certain functions remain in the vaporware stage of implementation.

An interesting feature of the SWS-0060's software is the More option. This menu selection brings up four subchoices: Software Setup, Hardware Setup, Control Tape, and Diagnostics. Software Setup can input batch files, output log files, save menu parameters, and change the border color. Hardware Setup lets you select the tape direct memory access (DMA) channel, tape port I/O number, and DMA buffer size. Since DMA channel 1 is not likely to be already in use on an IBM PC or XT, that is the default setting. However, if you install a network that uses DMA channel 1, you can switch to DMA channel 2 by changing jumpers on the controller card. Changing the tape port I/O number involves sending the board back to the factory. In most cases, the default values are okay, but at least these options are available in case you need them. The Control Tape option lets you use the software to erase, rewind, or tension the tape. You can also run tape diagnostics by selecting the appropriate menu choice. If you prefer, you can override the menus and control the tape drive by entering a command called STAPE along with any appropriate parameters.

Sigma Designs' SWS-0060 drive is a reliable and versatile performer that is easy to use and reasonably fast. The hardware—tape drive and controller—responded flawlessly to commands, and according to Sigma, the completed software should be ready by the time you read this. Overall, this is a solid tape backup device whose performance should improve considerably once the software is completed.—**Joe Desposito**

*Frank J. Derfler, Jr., is a contributing editor of PC Magazine. Vincent Puglia, Joe Desposito, and Phil Wiswell are frequent contributors to PC Magazine.*

## Tape Backup Systems: Summary of Features

Product Company	List price	Price per megabyte	Type of medium	Capacity (megabytes)	Size/type of interface card	Price of card alone	Size of unit (inches)	Error-correction technique	Type of backup	Appends file to tape	Uses archival bit	Has automatic backup
5210 FloppyTape Backup System Cipher Data Products Inc.	XT: \$1,095 AT: \$1,195	\$43.80	DC 600A cartridge	25	XT uses floppy controller; AT uses half-length card	XT, n/a* AT, \$149	16 x 8 x 5½	CRC**	File-by-file	Yes	Yes	No
Geno Galaxy 3220T Geno Systems Corp.	\$1,095	\$59.95	TEAC CT 450 or TC 500 cassette	20	Half-length card	\$179	8½ x 5½ x 15	CRC**, read-after-write	Mirror-image or file-by-file	Yes	Yes	No, but under development
Geno Galaxy 3260 Geno Systems Corp.	\$1,400	\$24.00	DC 600A cartridge	60	Half-length card	\$329	16 x 8½ x 5½	QIC (incl. CRC)	Mirror-image or file-by-file	Yes	Yes	Yes
HP 9142A Hewlett-Packard Co.	\$1,889	\$31.48	Hewlett-Packard 60 cartridge 92242L or 92245	60	Half-length card	\$199	12½ x 5½ x 11½	Exclusive or 50% redundancy method	Mirror-image or file-by-file	Yes	No	No
F TAP10 F Interface Inc.	\$995	\$99.50	DC 1000 or TC 200 minicartridge	10	Floppy controller	n/a	8½ x 3½ x 15	CRC**, read-after-write	Mirror-image or file-by-file	Yes	Yes	No
F TAP45X F Interface Inc.	\$1,795	\$39.89	DC 300XL cartridge	45	Short board	\$250	15 x 8½ x 3½	QIC-24 (incl. CRC), read-after-write	Mirror-image	No	No	No
LI-6085 Lintec Inc.	\$895	\$14.92	DC 600A tape cartridge	60	Long board	\$285	8½ x 5½ x 12½	QIC-36 (incl. CRC), read-after-write	Mirror-image or file-by-file	Yes	Yes	No
M10 Micro Design International Inc.	\$525	\$52.50	Micro Design's 3½" tape reel	10	Floppy controller, optional free cable for AT and compatibles	n/a	10 x 3 x 9	ECC†	Mirror-image	No	No	No
PC-68 Alley Computer Products	XT: \$995 AT: \$1,190	\$16.58	DC 600A cartridge	60	XT uses floppy controller; AT uses half-length card	XT, n/a* AT, \$195	5½ x 8½ x 15½	CRC**, read-after-write	File-by-file	Yes	Yes	No
SWS-0660 Sigma Designs Inc.	\$1,595	\$26.58	Sigma's self-threading one-reel tape	60	Short board	\$195	14½ x 8 x 5½	CRC**, read-after-write	Mirror-image or file-by-file	Yes	No	Yes
Sygen QIC-Fila Sygen Inc.	\$1,495	\$24.91	DC 600A cartridge	60	Short board	\$210	2 x 6 x 9½	ECC†	Mirror-image or file-by-file	Yes	Yes	Yes, (default)
Tecmar QIC-60H Tecmar Inc.	\$2,144	\$35.73	DC 600A cartridge	60	Short board	\$149	7 x 3½ x 15½	CRC**, read-after-write	Mirror-image or file-by-file	Yes	Yes	Yes, from BAT or BASIC programs
The MaynStream 26 Maynard Electronics	\$1,595	\$79.70	Maynard's ½" streaming tape	20	Short board	\$395	15 x 6 x 4	ECC†	File-by-file	Yes	Yes	No

\*n/a = not applicable

\*\*CRC = Cyclical Redundancy Check

†ECC = Error-Correcting Code

# "Her smile was so enchanting,"

"there was no way I could refuse her.  
So when she asked me to help her write the Annual Report,  
I was ready and willing."

✓ denotes IBM-AT compatibility.

## SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

### Alpha Software

Keywords	\$49.
DataBase Manager II 2.02	169
Electric Desk 1.1	195

### Aptec

Rainbow Writer Color Text Formatter 2.1	119.
Rainbow Writer Screen Grabber 1.1	69
ColorScreenPrint 2.0	59

### Ashton-Tate

dBase II 2.43	call
dBase III	call
Framework II	call

### Best Programs

PC Connection 15-day money back guarantee on these Best Programs.

PC/Tax Cut (1986 version for 1985 taxes)	124.
Personnel Series Level I	279
Personnel Series Level II	419

Personnel Series Level III	559
Personal Finance Program 2.0	65
Professional Finance Program 4.0	149

PC/Fixed Asset System 3.0	329
---------------------------	-----

### Bible Research

THE WORD 3.0 (KJV Bible)	157.
THE WORD 3.0 (NIV Bible)	157.

### Boylan International

Turbo Tutor 1.0	19.
Turbo Database Toolbox 1.1	30.
Turbo Graphics Toolbox 1.0	30.

Turbo Editor Toolbox 1.0	37.
Turbo Frameworks 1.0	37.
Turbo Newpack (Frameworks and Editor)	57.

Turbo Lightning 1.0 (w/spelling dictionary and thesaurus)	57.
Sidekick 1.5 (copy-protected)	30.
Sidekick 1.5 (non-protected)	48.

Reflex 1.0	57.
Superkey 1.1	37.
Superkey/Sidekick Package (includes \$15 rebate coupon from Borland)	67.

Turbo Pascal 3.0	37.
Turbo Pascal 3.0 w/BCD	59.
Turbo 8087 3.0	59.

Turbo 8087 3.0 w/BCD	72.
Turbo Holiday Pak (Pascal 3.0, Tutor, and Database Toolbox)	67.
Turbo Holiday Jumbo Pak (Pascal 3.0, Database, Editor & Graphics Toolboxes, Tutor and Frameworks)	139.

## PC Connection Software Special through February 28, 1986

### MICROSOFT

#### -Windows

Get the whole picture as you work back and forth between multiple applications, and pass information between standard DOS and Windows applications.

Includes:

- MS DOS Executive (DOS file manager and Microsoft Windows Write and Paint)
- Clock/calculator, alarm, notepad and calculator
- Clipboard (to view copied applications)
- RAM drive and print spooling control panel

For the IBM-PC, XT and AT ..... \$62.

### SPI Accounting Software

General Ledger C.13	289.
Accounts Payable C.13	289.
Accounts Receivable C.13	289.

Business Builder (GL, A/R, A/P, Payroll, information management, spreadsheet, business graphics and word processing)	399.
Breakthrough	

Timeline 2.0	249.
Broderbund	

Bank Street Writer	49.
Print Shop	35.

Graphics Library #1	22.
Conceptual Instruments	

The Desk Organizer 2.0	59.
Connecticut Software	

Sideline 5.0	37.
Printer Boss 5.0	99.

Dac Software	
Dac Easy Word	32.
Dac Easy Accounting 1.0	45.

Decision Resources	
Chart-Master 6.1	237.
Diagram-Master 5.0	207.

Sign-Master 5.1	157.
Digital Research	

GEM Desktop 1.2	30.
GEM Draw 1.2 (includes Desktop)	93.
GEM Collection 1.2 (includes Desktop, Paint and Write)	119.

Dow Jones	
Market Manager +	\$145
Spreadsheet Link	145.
Membership Kit	19.
Electronics	
»Energistics 1.3	165.
Evergreen	
One Write Plus 1.0	169.
Financial Software	
Financier II 2.1	59.
Friendlysoft	
Friendly Writer 3.2 (w/Friendly Speller)	55.
Funk Software	
Sideways 3.0	37.
Graphic Communications	
Graphwriter Combo Set	305.
Freelance	
Harvard Associates	
PC LOGO 2.0	89.
Harvard Software	
Harvard Project Manager 1.16	209.
Harvard Total Project Manager 1.0	299.
Human Edge	
Mind Prober	27.
Infocon	
Cornerstone 1.0	279.
Lifetree	
Volkswriter 3	159.
Volkswriter Scientific 1.0	299.
Living Videotext	
ThinkTank 2.0	109.
Ready 1.0	54.
Micro Education (MECA)	
Jim Fox Running Program 1.2	49.
Managing Your Money 2.0	99.
Micropro	
Easy 1.0	97.
WordStar 3.31	179.
WordStar Propak 3.31	259.
Hard disk recommended for Wordstar 2000 & Wordstar 2000 Plus	
WordStar 2000 1.01	259.
WordStar 2000 Plus 1.01	299.
Microrim	
Extended Report Writer 1.2	85.
Cloud 2.0	135.
Rbase 5000 1.01	369.
Upgrade Kit to Rbase 5000	129.
Microsoft	
Multiplan 2.0	119.
Microsoft Word 2.01 (w/Ready)	247.
Microsoft Project 2.0	call
Microsoft Chart 2.0	call
Windows 1.0	special

**PC CONNECTION®**

# "But was I able?"

"She wanted to know every little detail of my configuration. 'Don't you have a hard disk?' she asked sweetly. 'What word processor do you use? Can you do dual-document editing?'"

The following Microsoft mice now come with PC Paintbrush 3.0 software:

Microsoft Bus Mouse with software \$5.00 \$135.

Microsoft Serial Mouse with software \$5.00 \$135.

#### LANGUAGES

Quick Basic 1.0 ..... 69.

Pascal Compiler 3.31 ..... 175.

Macro Assembler 4.0 ..... 105.

Fortran Compiler 3.31 ..... 205.

Basic Interpreter 5.28 ..... 205.

Basic Compiler 5.36 ..... 235.

C Compiler 3.0 ..... 235.

Business Basic Compiler 1.10 ..... 258.

#### Microsoft

InfoScope 1.03 ..... 45.

CrossTalk XVI 3.6 ..... 95.

Remote 1.3 ..... 95.

Transporter 1.4 (includes Crosstalk) ..... 169.

#### Multimata International

Just Write 1.0 ..... 79.

Multimata 3.31 ..... call

Multimata Advantage 3.6 ..... call

#### Nantucket Software

Clipper ..... 349.

Peter Norton ..... 349.

Norton Utilities 3.1 ..... 59.

#### Powerbase Systems

Powerbase 2.1 ..... 197.

#### Quardrdeck

DesqVIEW 1.0 ..... 65.

#### Rossoft

Prokey 4.0 ..... 89.

#### Satellite Software

WordPerfect 4.1 ..... 239.

#### Scarborough Systems

Your Personal Net Worth 1.1 ..... 59.

Simon & Schuster

Webster's New World Speller 1.2 ..... 39.

#### Softstyle

Printworks 1.05 ..... 39.

#### Software Digest

Ratings Newsletter

This publication is unparalleled for its comprehensive, reliable evaluations. 1985's issues evaluate the following programs: word processors, file mgt., database mgt., spreadsheets, graphics, integrated accng., project mgmt., communications, integrated productivity.

Single copy ..... 24.50.

Year subscription ..... 245.00.

#### Software Group

Enable 1.1 ..... call

#### Software Publishing

PFS:Plan B:00 ..... 59.

PFS:Report B:01 ..... 77.

PFS:Access A:00 ..... 84.

PFS:File B:01 ..... \$84.  
PFS:Graph B:01 ..... 84.  
PFS:Plan A:01 ..... 84.  
PFS:Write C:00 (w/PFS:Proof) ..... 84.

PFS:First Success (Combi Pack includes PFS: Write, Prof., Plan, File) ..... 229.

Sorcim/MUS ..... 199.

SuperCalc 3.2.1 (w/Sideways) ..... 199.

Spectrum Holobyte ..... 229.

Art Studio ..... 32.

Executive Picture Show ..... 139.

Springboard ..... 35.

Newsroom ..... 35.

Clip Art Volume 1 (for Newsroom) ..... 19.

Unison ..... 22.

Art Gallery 1 ..... 22.

Printmaster 1.1 ..... 37.

United Software ..... 37.

Einstenwriter 7.2 (w/coupon for free Speller) ..... 99.

In-House Accountant 2.05 ..... 109.

ASCII Pro 4.23 ..... 69.

Xanero ..... 22.

Ability 1.0A ..... call.

## TRAINING

#### ATI

SKILL BUILDER PROGRAMS

Intro and How To Use:

Word Processing MS-DOS

Business Software PC-DOS

Data Bases Typing Tutor

Compaq BASIC

IBM-PC ..... each 38.

TRAINING POWER PROGRAMS

How to Use:

dBase II dBaseIII Lotus 1-2-3

MS Word Supercalc 3 Multimata

Multiplus Wordstar Framework

Wordperfect Symphony Displaywriter 3

each 49.

Friendlysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

INDIVIDUAL SOFTWARE

The Instructor II ..... 35.

Professor DOS ..... 47.

Tutorial Set (both items above) ..... 75.

Professor Pixel ..... 47.

Typing Instructor ..... 39.

Friendysoft

PC Intro Set ..... 35.

# "I knew we were compatible,"

"but if I didn't get more memory,  
an on-line Thesaurus, and Automatic Outlining  
in a hurry, the only thing getting the boot  
would be me."

## Springboard (continued)

Music Maestro (ages 4 to 10).....	\$22.
Easy As ABC (ages 3 to 6).....	24
Stone (requires graphics board)	
Across the U.S.A. (ages 5 and up).....	22
My Letters, Numbers, Words (ages 1 to 5).....	29
Kids Stuff (ages 3 to 8).....	29
Memory Master (ages 3 to 8).....	29

## The Learning Company

Addition Magician (ages 6 to 10).....	23
Magic Spells (ages 6 to 10).....	23
Word Spinner (ages 6 to 10).....	23
Radar Rabbit (ages 5 to 7).....	26
Moptown Hotel (ages 8 to 13).....	26
Number Stumper (ages 6 to 10).....	26
Moptown Parade (ages 8 to 12).....	26
Rocky's Boots (ages 9 and up).....	32

## RECREATIONAL

Blue Chip	
High finance simulations.	
Baron	32.
Millionaire	32.
Squire	32.
Tycoon	32.
Broderbund	
Championship Lode Runner.....	23.
Ancient Art of War.....	27.
CBS	
Murder By The Dozen (your turn, Sherlock)	21.
Electronic Arts	
Pinball Construction Set.....	25.
Dr. JLarry Bird One-on-One.....	28.
Music Construction Set.....	28.
Friendlysoft	
PC Arcade	35.
Fantastic	
Among the finest arcade style games available.	
Cosmic Crusader.....	27.
Snack Attack II.....	27.
Big Top	29.
Master Miner	29.
Heyden Software	
Sargon III (highest rated Chess program).....	35.
Infocom Difficulty levels shown in italics	
JUNIOR	
Seastalker	25.
STANDARD	
Enchanter	
Witcher	
Cuthroat	
Wishbringer	
Hitchhiker's Guide	

## ADVANCED

Zork II	22.
Sorcerer	24
A Mind Forever Voyaging.....	each \$29.
EXPERT	
Deadline	
Suspender	
Spelbreaker	
Invisiculus (hint booklets) are available for most infocom games. Specify game.....	6.
Microleague Sports	
Microleague Baseball (you are the manager).....	25.
Micropose	
F-15 Strike Eagle.....	22.
Microsoft	
Flight Simulator 2.12 (now works with Hercules Mono Card).....	32.

## 1Step Software

Golf's Best (Pinehurst or St. Andrew's).....	32.
Origin Systems	
Ultima III.....	39
Parlor Software	
Bridge Parlor (the best Bridge simulation).....	49

## PCSoftware

Championship Blackjack.....	23
Chess 2001.....	27.
Armchair Quarterback.....	27.
SEGA	
Spy Hunter.....	29

## Sierra On-Line

Championship Boxing.....	24.
Ulysses.....	24.
King's Quest	
King's Quest II.....	33.
Sir-Tech	
Wizardry.....	42.

## Spectrum Holobyte

GATO.....	27.
Telstar (w/Halley's Comet).....	32.
Sublogic	
Night Mission Pinball.....	29.
Jet.....	33.

Six scenery (airport) disks are available for Jet.....	each 15.
--	----------

## Telarium

Rendezvous with Rama.....	27.
Amazon.....	27.
Fahrenheit 451.....	27.

## XOR

NFL Challenge (be the coach).....	\$79
-----------------------------------	------

## HARDWARE

### AST Research

All AST Boards come with a full one year warranty.

SixPak Plus 64k upgradeable to 384k, with clock calendar, serial & parallel ports & now includes Sidekick version 1.5 non-copy protected (game port optional).....	225.
384k (fully populated).....	249.
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional).....	249.
VO Plus II with clock calendar and serial port (parallel, game, or second serial port optional).....	125.

Parallel, game, or second serial port for any AST board (specify board).....	35.
--	-----

AST-5251-11.....	579.
------------------	------

AST-3780.....	579.
---------------	------

Raceh Modem half card 300/1200 baud internal modem includes Crosstalk XVI.....	349.
--	------

Advantage 128k upgradeable to 1.5 Meg (or more with Piggyback Card), with serial, parallel ports, now includes Sidekick version 1.5 non-copy protected (game port and second serial port optional).....	399.
---	------

RAMpage! upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS).....	call
--	------

### Amdek

Video 300G composite monitor (green).....	129.
Video 300A composite monitor (amber).....	139.
Video 310A mono monitor (amber).....	169.
Color 600 - RGB monitor.....	359.
Color 710 - RGB monitor.....	449.

CompuCable	
Plastic Keyboard & Drive Cover Set.....	17.
IBM Mono Screen Enhancement.....	17.
Cuesta	
Uninterruptible power backup units	

Datasaver 240 WATT.....	call
Datasaver 400 WATT.....	call
Curtis	
ACCESSORIES	
PC Pedestal (for IBM Mono or Color).....	37.

Portable Pedestal.....	47.
System Stand (for IBM-AT).....	37.
Low Profile Tilt and Swivel Pedestal.....	37.
Crystal 300-watt (line conditioner).....	159.

**PC CONNECTION®**

# "So I asked for her number."

"She just smiled  
and handed me a slip of paper.  
'Before you try to connect with me, you better  
connect with them.'"

**CABLES**

-AC Plug Adapter (any monitor to your PC) . . . . .	8
-Smartmodem to IBM Cable . . . . .	\$17.
-Keyboard Extension Cable (3 to 9 feet) . . . . .	27.
-Extension Cables for IBM Mono Display . . . . .	33
-Color and Monochrome Extension cables . . . . .	39.
-Printer-to-IBM cable . . . . .	17

**SURGE SUPPRESSORS**

All surge suppressors have an on/off switch:	
-Safestrip . . . . .	21
-Diamond (5 outlets) . . . . .	29.
-Emerald (6 outlets; 6 ft cord) . . . . .	36.
-Sapphire (3 outlets; EMIF/RFI filtered) . . . . .	47.
-Ruby (6 outlets; EMIF/RFI filtered; 6 ft cord) . . . . .	53.
-Command Center (5 outlets; EMIF/RFI filtered; digital clock; master key switch; circuit breaker) . . . . .	123.

**DataProducts**

-8050 color printer . . . . .	call
-8070 color printer . . . . .	call

**Epson**

All Epson dot matrix printers have built in graphics capability. In addition, the LX-80, FX-85, FX-185 and LX-90 can print in near letter quality (NLO).

-DX-10 (letter quality) . . . . .	call
-DX-20 (letter quality) . . . . .	call
-DX-35 (letter quality) . . . . .	call
-FX-85 . . . . .	call
-FX-285 (replaces FX-185) . . . . .	call
-JX-80 . . . . .	call
-LX-80 . . . . .	call
-LX-90 . . . . .	call
-LQ-1500 (letter quality dot matrix) . . . . .	call
-SQ-2000 Ink Jet . . . . .	call
Epson Books . . . . .	call
Printer-to-IBM cable . . . . .	15.

We are an authorized Epson service center. Ask about the extended service plan.

**FTG**

Light Pen . . . . .	195
Demo Disk for Light Pen . . . . .	39

**Hayes**

-Smartmodem 300 . . . . .	149
-Smartmodem 1200 . . . . .	389.
-Smartmodem 1200B (w/Smartcom II) . . . . .	349.
-Smartmodem 1200B (no software) . . . . .	299.
-Smartmodem 2400 . . . . .	579.
-Smartmodem II 2.1 (software) . . . . .	89.
-Transet 1000 . . . . .	269.
-Accessory Kit for Transet 1000 (cable and software) . . . . .	29.

**Hercules**

-Hercules Color Card (parallel port) . . . . .	169
--	-----

**PC Connection**  
**Hardware Special**  
through February 28, 1986

**ORCHID TECHNOLOGIES**  
**Conquest Multifunction Board 8k**

A multifunction board that can hold as much as 2 Meg and supports Lotus/Intel Expanded Memory Specifications (EMS) as well as allowing you to backfill to expand your DOS accessible memory to 640k. Use as many as 4 Conquests for up to 8 Meg of total RAM or add optional PC Net daughterboard for LAN system.

## Includes:

- clock/calendar
- serial and parallel ports
- software for disk cache, RAM drive and print spooler

For the IBM-PC and XT . . . . . \$264.

-Hercules Graphics Card (parallel port) . . . . . 289.

-Hercules Graph-X Software 2.0 . . . . . 42.

**Innovative Concepts**

-Flip n' File 50 . . . . . 12

-Flip n' File 50 w/lock . . . . . 18

-Library Case (holds 10 disks) . . . . . 4

**Intel**

-Above Board PC . . . . . call

-Above Board AT . . . . . call

-Piggyback board for AT . . . . . call

8087-3 . . . . . 129.

8087-2 . . . . . 139

80287 . . . . . 225.

**Kensington Microware**

-Masterpiece . . . . . 94.

-Masterpiece Plus . . . . . 129.

-Printer/portable computer stand . . . . . 17.

**key tronic**

5150 keyboard . . . . . 115.

5151 keyboard (deluxe) . . . . . 169.

5153 keyboard (with touch pad) . . . . . 289.

**PC Connection** 210M  
6 Mill St., Marlow, NH 03456  
603/446-3383

For the IBM-PC Exclusively.

-AT Converter (allows Keytronic 5151 keyboard to work with the AT) . . . . . \$12.

**Kraft**

-Joystick . . . . . 29.

-Executive Cursor Control (w/Joystick) . . . . . 47.

-Executive Cursor Control (software only) . . . . . 27.

**Mouse Systems**

-PC Mouse (w/software, pad, & PC Paint) . . . . . 139.

**NEC**

-Pinwriter P2-3 (IBM, 80 column) . . . . . 559.

-Pinwriter P3-3 (IBM, 132 column) . . . . . 759.

-Pinwriter P5 (IBM, 132 column) . . . . . 899.

-Spinwriter 3550 (letter quality 32 cps) . . . . . 1099.

-Spinwriter 8850 (letter quality 50 cps) . . . . . 1489.

**Orchid Technologies**

All Orchid Boards come with PCNet Drive (Ram disk), PCNet Spool (print spooling), disk caching & partitioning. Conquest Multifunction Board 8k upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS), includes clock calendar, serial port, and parallel port. A PCNet Daughter Board can be added . . . . . special PCNet Daughter Board piggybacks to Conquest with networking software . . . . . call

-PC Net (stand alone card) . . . . . call

-PC Turbo 186 w/256K and Turbo Daughter Board, expandable to 640k, increase the speed of your PC . . . . . call

-Eccell Multifunction Card for the AT 8k upgradeable to 1 Meg, fully supports LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code (ECC), (serial and parallel ports optional) call

**Paradise Systems**

-Color/Mono Card . . . . . 149.

-Modular Graphics Card . . . . . 275.

-Beckpack for Modular Graphics Card (2Mb upgradeable to 384K) . . . . . 225.

-MultiDisplay Card . . . . . 195.

-Five Pack w/384K . . . . . 149.

**PC Designs**

-FD 1000 Computer . . . . . 789.

PC Magazine called it "a top performance bargain" (Oct. 15). PC Week called it "a terrific machine at a terrific price" (May 10).

Please call for more information about this computer.

**Princeton Graphics**

-HX-12 RGB monitor (690 x 240) . . . . . 449.

-HX-12E RGB monitor (EGA compatible) . . . . . 589.

-MAX-12E Amber monochrome monitor . . . . . 179.

-SR-12 RGB monitor (690 x 480) . . . . . 587.

-ISM Scan II Board for SR-12 . . . . . 149.

**1-800/243-8088**

IPC CONNECTION

# "800/243-8088, she wrote"

"My hands were shaking but I dialed.  
 Two days later my system was fully upgraded.  
 The smile turned me on. But it was PC Connection  
 that got me on a roll."

## Quadram

Expanded Quadboard with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software.	
384k (fully populated) . . . . .	\$229.
256k (upgradeable to 384k) . . . . .	195.
Gold Quadboard 256k upgradeable to 640k, includes Quadmaster III software, clock calendar, serial port, parallel port, and IBM compatible color graphics (second serial or parallel port optional) . . . . .	387.
Silver Quadboard 256k upgradeable to 640k, includes Quadmaster III software, clock calendar, two serial ports, and game port . . . . .	229.
Liberty Board 64k upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS) . . . . .	287.
Quad Sprint wi8086 processor, increases the speed of your PC . . . . .	479.
Short Ram Card 64k . . . . .	169.
Microfiche Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k . . . . .	159.
Quadcolor 1 . . . . .	197.
Quadchrome Monitor . . . . .	469.
<b>SMAs</b>	
PC-Documate Keyboard Temples available for:	
DOS Basic 2.0-2.1	Supercalc 3
DOS/Basic 3.0-3.1	Wordstar
Lotus 1-2-3	Wordstar 2000
Symphony	Turbo Pascal
Framework	WordPerfect
dBase II	dBase III
Multimate	each 12.
<b>Toshiba</b>	
All Toshiba printers listed are 24 pin dot matrix.	
P1340 printer (80 column) . . . . .	439.
P1341 printer (136 column) . . . . .	899.
P1351 printer (136 column) w/serial and parallel interfaces . . . . .	1129.
<b>WICO</b>	
Joystick . . . . .	35.

## DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k.

## Control Data (CDC)

(5 1/4") half-height drive (DS/DD) . . . . .	\$79.
<b>IONEGA</b>	
Bernoulli Box 20 Meg with PC/2 Card . . . . .	2349.
10 Meg cartridge . . . . .	48.
Head Cleaning Kit . . . . .	69.
Standard Interface (PC/2) Card . . . . .	129.
We are an authorized IONEGA service center.	

## OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge cards.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All shipments insured; no additional charge.
- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
- COD max \$1000. Cash or certified check.
- 120 day guarantee on all products.\*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

## SHIPPING

**Continental US:** For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information

# 1-800/243-8088

**PC Connection** 210M  
6 Mill St., Marlow, NH 03456  
603/446-3383

For the IBM-PC Exclusively.

## Seagate

20 Meg Internal Hard Drive (w/controller, cables, and manual) . . . . .	\$469.
---	--------

## Shugart

10 Meg Internal Hard Drive (w/controller, cables, and manual) . . . . .	369.
---	------

## Tallgrass Technology

TG 5025-25 Meg Hard Drive (w/controller and 60 Meg Backup Unit) . . . . .	call
---	------

## Tandon

TM 100-2 (5 1/4") full-height drive (DS/DD) . . . . .	95.
---	-----

## TEAC

FD-65B (5 1/4") half-height drive (DS/DD) . . . . .	85.
---	-----

## Toshiba

AT 380k Drive (5 1/4") half-height drive . . . . .	99.
--	-----

## MEMORY

### 64k Memory Upgrade Set for IBM-PC or XT system board or any memory board

150 nanosecond (set of 9) . . . . .	10.
-------------------------------------	-----

200 nanosecond (set of 9) . . . . .	9.
-------------------------------------	----

### Install memory upgrades & run diagnostics at time of board purchase only . . . . .

128k Memory Upgrade Set for IBM-AT System Board (9 chips) . . . . .	39.
---	-----

256k Memory Upgrade Set for any IBM-AT memory board (9 chips) . . . . .	39.
---	-----

## DISKS

### DS/DD Disks for the PC & XT (40 TPI).

10 disks per box.	
-------------------	--

Maxell MD-2 . . . . .	19.
-----------------------	-----

Vermatim Detachable (w/free calculator—for a limited time only) . . . . .	19.
---	-----

### DS/High Density Disks for the AT (96 TPI).

10 disks per box.	
-------------------	--

Fujifilm . . . . .	35.
--------------------	-----

Maxell . . . . .	39.
------------------	-----

Vermatim . . . . .	45.
--------------------	-----

Flip Sort (holds 75 disks) . . . . .	15.
--------------------------------------	-----

## INFORMATION SERVICES

### Compuserve

Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications) . . . . .	27.
---	-----

### Dow Jones

Membership Kit . . . . .	19.
--------------------------	-----

### Source Telecomputing

The Source (subscription and manual) . . . . .	39.
--	-----

\* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS.  
 © COPYRIGHT MICRO CONNECTION, INC. 1985. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

PC CONNECTION and PC CONNECTION are registered trademarks, and MICRO CONNECTION is a trademark of MICRO CONNECTION, INC., MARLOW, NH.  
 THE RACCOON CHARACTER (S) IS A TRADEMARK OF MICRO CONNECTION, INC., MARLOW, NH.

CIRCLE 339 ON READER SERVICE CARD





# PC Persistence.

#### Or, Paradise Revisited.

Remember this picture? We used it in our very first raccoon ad about two years ago. Back then we wrote your orders out by hand, and filed them on top of the fireplace mantle. 256K was a lot of memory. And, according to our calculations, only about 10% of the people now reading this ad even owned a PC.

But persistence has paid off. We've grown and thrived throughout all the trials and tribulations of the PC marketplace. Why we don't even have to sell moonshine anymore to make ends meet.

#### Traditional values.

Shortly after our world famous micro mascot first plowed his way through your typical Marlow snowdrift, we cleared off the mantle and loaded everything into an IBM System 38. This mighty mainframe gives our sales consultants instant access to a multitude of mesmerizing minutiae. Like product availability, the status of your order, how much memory a program requires, what printers it supports, and whether a new version is expected soon.

With an ever-increasing array of electronic wizardry at their fingertips, our persistently pleasant phone people

can help you take your PC to new pinnacles of performance. You see, we still go to mind-boggling lengths to answer your toll-free technical questions—before or after the sale. We still guarantee every product we sell for a full 120 days, and many for longer than that. Our prices are still consistently among the lowest around. And, if a price ever goes down before we ship, you will automatically get the new low price.

**Only a 4.3 light year drive from Alpha Centauri.**  
Alas, Marlow, NH remains a bit off the beaten track for even the most adventuresome of our customers. But you still have a standing invitation to visit us the next time your business takes you to Boston, or pleasure takes you to the ski areas of Vermont and New Hampshire. This spring we'll be opening our completely renovated store and training center in the old Christmas Trees Inn (partially pictured above) across the river from our headquarters.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.

For the IBM-PC (XT & AT) exclusively.

**IPC CONNECTION**

# TECHNOLOGIES IN COMPETITION

**I**t's not a question of if, but when. At some time or other, whether because of a software bug, a power glitch, an operator error, or an apparently inexplicable head crash, the data on your hard disk is going to be unrecoverable. And as the applicable corollary of Murphy's Law puts it, the probability of hard disk data loss is directly proportional to the importance of the data and inversely proportional to the frequency of data backup.

There are a variety of ways to protect yourself against catastrophic data losses. The most familiar, of course, is to back up at least the most crucial material onto floppy disks. But floppy disk backup is reasonable only for individual programs or relatively short groups of files. When it comes to ensuring the entire contents of a 10- to 30-megabyte (or larger) fixed disk, floppy backup is just too expensive,

both in media and in time. Put simply, it doesn't get done.

While there are other backup alternatives worthy of consideration, in this issue we've chosen to concentrate on the most widely used backup medium. Magnetic tape offers the longest successful track record and the lowest cost per byte.

**MEDIA OPTIONS** The 3M Corp. introduced  $\frac{1}{4}$ -inch data cartridges as long ago as 1971, when it

became apparent that smaller computers required the use of a more appropriately sized alternative to the  $\frac{1}{2}$ -inch open-reel tape systems that have traditionally dominated the mainframe world.

Today's standard-size  $\frac{1}{4}$ -inch data cassettes, used in the now-common 9-track format, are available with tape lengths of 300, 450, and 600 feet, which correspond (roughly) to storage capac-

---

Myriad tape backup formats, sizes, and methods  
are vying to become the industry standard.  
The most popular,  $\frac{1}{4}$ -inch tape, incorporates  
three more competing technologies.

---

T • A • P • E

---

# BACKUP



## ■ TAPE BACKUP TECHNOLOGIES

ties of 30, 45, and 60 megabytes. Indeed, the high-density tape formulations used in the 600-foot tapes can be reliably pushed to 134 megabytes.

Although the cartridges were originally designed for minicomputers, backup capacities in this range also nicely cover the requirements of PC-XTs and PC ATs. 3M is the largest supplier of such media, with Data Electronics Inc. (DEI) the dominant secondary source.

Regular DC300 and DC600 series data cartridges measure approximately 4 by 6 by  $\frac{1}{2}$  inches. While this size is appealingly small from the perspective of data processing managers, it often seems inconvenient to attorneys, doctors, and other business professionals whose experience of tape has been principally limited to Philips audio cassettes.

Appealing especially to these latter users are the DC1000 minicartridges, which measure only a bit over 2 by 3 by  $\frac{1}{2}$  inches and use nine tracks to record up to 10 megabytes on a  $\frac{1}{2}$ -inch-wide tape. (The I<sup>2</sup> Interface I<sup>2</sup>TAP10 unit reviewed in this survey uses this minicartridge.) Just introduced, and certain to attract both drive manufacturers and users, the DC2000 minicartridge is the same shirt-pocket size. It uses high-density  $\frac{1}{4}$ -inch tape and can hold 20 to 40 megabytes, depending on whether it is recorded using 12 or 24 separate tracks. These capacities, again, make a good match for somewhat smaller microcomputer backup needs. Moreover, such cartridges permit drive designers to think in terms not only of the standard 5 $\frac{1}{4}$ -inch disk "form factor" but also the (presumably) upcoming transition to 3 $\frac{1}{2}$ -inch drives.

Finally, TEAC, Maxell, Memtek (formerly Memorex), and Verbatim produce genuine digital cassettes visually almost indistinguishable from the audio variety. Operating at 90 inches per second (like most full-size data cartridges today), these tapes hold 20 megabytes on four recorded tracks and, according to Richard Newsome of Sysgen, offer the same data reliability as their larger siblings. (The same could not be said for the audio cassettes pressed into digital service by Apple and Commodore.)

While these systems make up your primary tape backup media choices, not all

microcomputer tape backup systems today use even the standard-size  $\frac{1}{4}$ -inch data cartridges in the same way. There are three principal contending systems built around the use of the  $\frac{1}{4}$ -inch data cartridge: those that follow the QIC (Quarter-Inch Compatibility) Committee standards; the PC/T system recently introduced by Tallgrass;

accepted by such stalwarts as NCR and Burroughs and have a wide appeal throughout the minicomputer industry. (In the accompanying reviews, models from Alloy (Aptec), Genoa, Tecmar, Sigma, Sysgen, Lintec, Maynard, and I<sup>2</sup> Interface are QIC-oriented units.)

Basically, the current QIC-24 standard calls for the use of nine tracks, which are recorded in a serpentine pattern. (When the end of the tape is reached on one track, the tape direction is reversed and the head repositioned so that the next track is recorded "backward." The tape need not be rewound between each of its nine passes.) A tape head with separate read and write gaps is used, so that data written to the tape can instantly be read and compared against the original, ensuring against errors. Tapes are erased in a single pass, and when Track 0 is written, the whole tape is erased. Tapes do not need preformatting before use. Either image or file-by-file backup/restore operation is permitted. To see the implications of these provisions, it's well at this point to turn to the second major  $\frac{1}{4}$ -inch data cartridge format.



and so-called "floppy tape" systems, associated most prominently with Cipher, but represented by other manufacturers, as well.

**THE QIC APPROACH** The oldest and largest industry group, the QIC Committee, has managed to agree on standards for nearly every aspect of  $\frac{1}{4}$ -inch data cartridge performance. Interconnections, interfaces, formats, and error correction are all covered—with the one exception that a tape made on one company's QIC backup system cannot always be read on machines made by another QIC company. (A QIC committee has been established, jointly chaired by Alloy and Sysgen, to correct this anomaly.) QIC standards have been

**THE PC/T APPROACH** While we were unable to test the Tallgrass TG-4060 Tape Storage System in time for this issue (we will test it soon, though), no discussion of divergent approaches to tape backup philosophy today could ignore that company's most significant recent contribution: PC/T. The acronym stands for "Personal Computer/Tape," and it represents a fundamentally different way of ensuring the integrity of data backup.

As indicated, QIC-24 systems use a read-after-write head to catch and correct errors "on the fly." A bad byte is immediately rewritten until the tape gets it right. With such an approach, however, there is no way to detect data errors that may arise on subsequent reads. A loose oxide particle, for example, that adheres momentarily to a head and is later dislodged and redeposited on the tape downstream will cause an undetectable error. In the QIC view, such errors are too rare to merit more attention than specifying the use of top quality tape.

The PC/T system takes an opposite approach. In this system, a single head is used to write data to the tape in two blocks



# For thousands of years, man used personal computers without decent tape backup. Enough.

Personal computers have come a long way. Unfortunately, tape backup systems have not. Their functions are primitive, they're frightening to install and truculent to use.

Genoa's Galaxy™ Systems are more highly evolved. So not only do they outperform competitive systems, but using them is actually something that can be done by an ordinary human.

## The simpler. The better.

Our software is what makes the difference between our systems and everybody else's. And it's designed to help you use the system easily in either of two modes. Namely, menu-driven or batch file.

The menu mode operates true to its name, with menus showing all the commands you have to choose from. And there isn't a thing you can't do from the menu mode because it's comprehensive.

You'll want to use the batch mode for routine operations though, because it allows you to create a "file"

to contain those operations and run them automatically, just by hitting a few keys.

But probably the best example of just how downright civil the Galaxy systems can be is our auto backup. You just preset the time and the desired function, and the system does the rest. Automatically.

No other tape backup systems, by the way, operate this simply.

## The features all tape backups should have. But don't.

Before you make your first backup — which is the right time to do this — our installation software checks your disk configuration to make sure your tape drive will run at top speed. And it checks the entire system to guarantee it will perform as promised. No competitive system offers anything like it.

Another thing you can do is abort any command at any time. So you don't have to sit through a 20-minute

file-by-file restore just because you hit the wrong key.

You can also do a file-by-file restore from an image backup. So you can get back the one file you need rather than all the files you don't.

But whether it's a couple of files or a complete image, you'll be pleased to know you can restore to any storage device, thanks to Galaxy's interchangeability feature.

Multiple backups on the same tape — even from multiple sources like a floppy or another hard disk — aren't a problem either. The system simply starts recording where the last backup ended.

Or you can use multiple tapes to back up very large files. The system will just let you know when it needs a new tape.

We also perform CRC error checking constantly. We can back up a 20 Mb disk in just over 4 minutes. And we're network compatible.

## What price progress?

Surprisingly, the Galaxies cost somewhat less than tape backup systems that offer less. Which includes all of them.

For the Genoa Galaxy dealer near you or complete specs, call 408-945-9720. Or write Genoa Systems Corporation, 73 E. Trimble Road, San Jose, CA 95131.

The Genoa Galaxy Systems. The most civilized tape backup in history.



The IBM®-compatible Genoa Galaxies are available as internal or external versions of 1/4" streaming tape or cassette models. (External cassette not shown.)

**G** **Genoa**  
We make PCs better.

of 4 kilobytes each. Using the same data that was fed to the first two blocks, a third, parity block is then constructed and written by performing an exclusive-or (XOR) operation. In this way, if for any reason one data block is corrupted, it can be identified and correctly reconstructed—during playback—by applying the same XOR procedure to the remaining two blocks. To minimize the possibility of two successive blocks being corrupted by a defect on the tape, they are physically separated by interleaving with other unrelated data/parity blocks.

Very little media is wasted for "system overhead" in the QIC-24 approach, but time is often lost in finding a specific file by having to access it sequentially. While no time-consuming preformatting pass is required, any time Track 0 must be written to, the whole tape is erased and must be re-written.

The penalty PC/T pays for its data integrity protection is the large amount of tape overhead, for which Tallgrass compensates by increasing the number of its tracks (on standard data cartridges) from 9 to 11. A second penalty is the need for an extensive (roughly 2 hours) one-time preformatting pass before a new tape is put into service. A compensating dividend of this procedure is that it subsequently allows directory-oriented random access to (and updating of) individual files without having to rewrite (or append to) an entire tape.

Both the (more) standardized QIC-24 and the PC/T formats have obvious merit to their conflicting claims, yet neither has shown (to date) markedly better error-free performance than the other. One point raised by an industry spokesman may be significant, however. While currently the 9-track QIC tapes produced by different manufacturers are not automatically interchangeable, with nothing more than suitable software they could be made so. On the other hand, a 9-track QIC machine will never be able to read an 11-track PC/T tape. The two formats are thus as incompatible as those of VHS and Betamax videocassette machines. While PC/T has been accepted as a standard (QIC-10), *Data Storage Report* (Volume 1 Number 6, August 1985, p. 13) indicates that the scope of this approval is currently limited to the DC2000 minicartridges that will be

primarily targeted at the upcoming 3½-inch form factor drives.

**TREATING TAPE AS A FLOPPY** Both QIC and PC/T backup systems require use of a separate tape controller—normally a half- or full-length board that plugs into one slot of the PC. (Software is added, as

---

■ **Tape backup systems that use the PC's own floppy disk controller and connect to the PC's bus output have recently been developed.**

---



well, through adding a DEVICE = line in your CONFIG.SYS file and copying the manufacturer's software into your root directory.) Such boards represent an expense, of course, and not infrequently spare PC slots are thus made dearer still. For these reasons, tape backup systems that use the PC's own floppy disk controller and connect to the PC's bus output connector have recently been developed by Cipher and others.

Floppy tapes, like floppy disks, require a preformatting pass, and, as in the PC/T format, a bad-sector table is constructed to block out clearly bad areas. Further, they are limited in storage capacity to the 32 megabytes (25 megabytes formatted) that the current versions of DOS can handle,

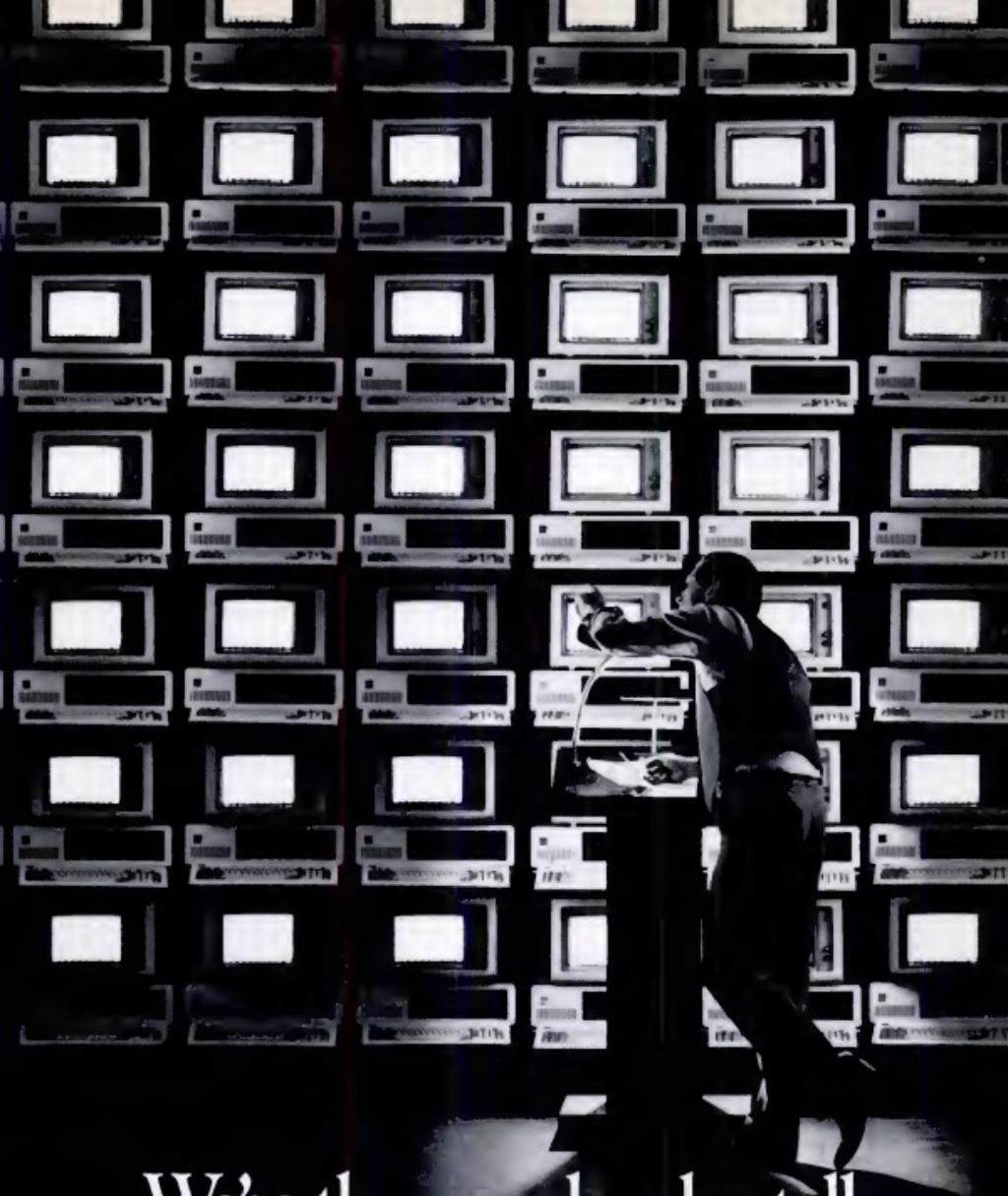
and micros such as the PC AT must be retrofitted with an appropriate bus connector. On the other hand, for backup of a number of units in an office, a single floppy-tape drive can easily be moved from machine to machine, since an internal controller board is not required in each. The claims for error rate ( $1 \times 10^{-11}$ ) are as good as or better than those for the other systems, though a different error detection/correction scheme is used.

A conventional floppy disk head (which is used by Cipher's 5210 Floppy-Tape Backup System) contains a single head gap that serves for both writing and reading. When you copy a file with the /V (verify) option, the head writes the data on the floppy, then switches to the read function and verifies it on the next pass. In the case of a DC600 tape with six tracks and 25 megabytes to be recorded on it, while one could stop, rewind, and replay each sector to verify it, the time it would take to do so is not very appealing.

According to Cipher's Rick Luttrall, for each 16 sectors written to tape, a 17th is added for parity checking (CRC). The system permits recovery, during replay (without rewriting) of the data for one bad sector encountered, and if two or more are found, the area is flagged and the user may choose to re-write.

**Beyond ½-INCH** While there is a D-CAS Committee for digital cassettes that roughly corresponds to the QIC Committee, to date this is a much less standardized marketplace. (On the other hand, the Genoa digital cassette unit tested here (the Galaxy 3220T) follows a QIC-4 standard, with a 90-inch-per-second, nine-track, serpentine format similar to its QIC-24 data cartridge unit.) Both 3M and Tallgrass have a strong interest in ensuring that the new DC2000 minicartridges will be very firmly standardized.

The DC2000 represents new growth among smaller-capacity tape backup systems. At the other end of the scale, even as this is being written, Cipher is introducing a 200-megabyte drive to use IBM's new ½-inch chromium dioxide cartridges. Wherever your backup needs fall, therefore, there are products aplenty from which to choose. And not to choose is to make sure you'll lose. ■



We're the people who tell  
the PC how to think.

# And every morning, we give

## MS-DOS.

It's the operating system that gives most computers their start. The system that is the brains of every IBM® PC. By definition, you can't be IBM compatible unless you're Microsoft compatible.

In short, most computers in the world won't make a move without Microsoft. When you're shopping for application software, neither should you.

Because we enjoy a degree of technological intimacy with the PC which simply can't be matched by anyone else. And helps explain why our programs exploit so brilliantly the capacities of IBM PCs and their compatibles. Programs we modestly label, "The High Performance Software."

An advertising boast. And eminently supportable.

Just as we keep advancing MS-DOS® itself (now in Version 3.1), we keep expanding the capacities of our applications. And matching those increased abilities with disk based tutorials, on-line help, and a superb system of direct telephone support.

The product of all this is a line of applications which combine a common sense operating style. Which makes them immediately usable. Along with an extraordinary depth of features. Which will be there to meet the demands you'll make as your computing abilities grow.

## Microsoft® Word.

The ultimate means of committing ideas to paper.

Whether you're writing a simple memo, or a major proposal requiring elaborate formatting, the sophisticated editing, outlining and formatting capabilities of Word get you finished faster. (In fact, this program is so advanced, we now offer a special version that takes full advantage of networks.)

Word's organizing ability is supplied free (thru February 28, '86) in the form of Ready!™



the memory-resident outline processor from the makers of ThinkTank.™

Once your thoughts are organized on screen, what you see is what gets printed out. Like *Boldface*, *underline*, *italics*, *subscript*, and *superscript*. Instead of hieroglyphics. So you don't have to keep printing drafts until you finally get what you want.

When you are ready, Word runs all popular



printers. Including the latest laser printers. Which Word will drive to absolutely stunning feats. So you can produce at your desk, document quality not previously seen outside a print shop.

Meanwhile, Word's ability to open windows lets you display multiple Word files on screen simultaneously. Making it extremely easy to cut and paste between documents. Or construct something new from what you've already written. Furthermore, you can instantly recall standard passages, phrases, or terms from Word's Glossary. And from the Stylesheet, all your standard formats.

All Word's abilities, from the basic to the most sophisticated can be learned easily as you go. A comprehensive Computer Based Training disk is included with the program. An interactive instruction system so highly evolved, it coaches you to proficiency at any pace you like.

Microsoft Word. When you want to get your story out fast.

## Microsoft Multiplan.™

The spreadsheet millions count on.

Our Multiplan spreadsheet is already running on over one million computers. Now the MS-DOS version has been enhanced.

The worksheet is bigger. An expanded matrix of 255 x 4095 adds up to over a million cells.

New Multiplan calculates up to four times faster



# 5,000,000 computers the boot.

than first generation Multiplan. (And faster than even the latest version of 1-2-3® in most uses.) While Multiplan macros reduce repetitive command sequences to a single keystroke.

Multiplan reads and writes 1-2-3 files with one deft command. So you can share spreadsheets painlessly from PC to PC. It's also the only spreadsheet that offers linking. Along with true model consolidation. (In batches, or one at a time.) All in one command.

So you can overwhelm those huge models. Not vice versa.

Yet, for all its power, Multiplan is a breeze to manage. Like you, it works intuitively. So you can deal with the most demanding jobs quickly and naturally.

If you're looking for your basic super spreadsheet—without the super pricetag—Multiplan is the one you'll want. In a crunch.

## Microsoft Chart.

For best performance in a supporting role.

Chart, which from the start has stood at the top in business graphics, is now offered in a new version. And a real dazzler it is.

When you're the one making the presentation, Chart backs you up with superior firepower in support of your arguments. Not only in black and white

and on paper, but in vibrant color, directly on high-resolution 35mm slides and overheads. And of course, Chart drives all the popular dot matrix printers, laser printers, and color plotters.

No other program comes near Chart's versatile talents. Choose from 177 colors. And graph formats of every description: bar, area, pie, column, high-low, and scatter charts. Up to 16 charts to a page. Add text anywhere in countless type styles. Move, size, or shift.

And now Chart links directly with Lotus® 1-2-3. As well as Microsoft Multiplan. So when the numbers change, the charts change, automatically. It works wonders, too, with VisiCalc®, dBASE III®, R:BASE 5000®, and a chorus of others.

So before you face another meeting, prepare yourself with Microsoft Chart. And enjoy the advantage of graphic superiority.

## Microsoft Access. The great communicator.

Access is our highly acclaimed new contribution to communication. Your link to the vast information stored in data services and your company mainframe. Because Access has the brains to take you by the hand and walk you through these often frustrating mazes.

It comes with menus for the most popular services, including Dow Jones™ CompuServe™, MCI Mail™, EasyLink™ OAG™, and NewsNet™.

Even better, Access gives you a way to simplify virtually any communication scenario. Using MASC, the powerful Access communication language, you create your own custom menus.

And with Access, you can even automate your telecom sessions. Simply invoke the programs learn function, and Access watches and permanently records the entire command sequence.

In addition, Access gives you an unprecedented array of juggling skills. Carry on eight communication sessions concurrently (using the X.PC protocol)





displaying them each in their own window. Contact two data services through two modems at once. Edit on-line or off line, and export that data into programs like 1-2-3 and Multiplan.

So you could, for instance, monitor every stock exchange. Collect quotes and price histories. Edit that info for a report. While sending the updated numbers to your spreadsheet. And do it routinely.

Microsoft Access. When you need to dig out information, it's a bulldozer.

#### Microsoft Project.

So you won't get buried by major undertakings.

This is the program that brings method to the madness of long and complex enterprises. Tasks made more manageable by Microsoft Project's adaptability. And by its easy-to-learn, uniquely intuitive operating style.

Unlike other programs, ours doesn't make you do drudge work. Instead, you simply enter data like you do on a spreadsheet. Then Microsoft Project cranks out the Pert and Gantt charts for you.

You get all the features you need to get a handle on any logistical problem. Including Plan versus Actual tracking.

And scheduling from minutes to months.

We also make sure it won't be a major project to learn Microsoft Project. Included with the software is a complete course on a Computer Based Training disk. A uniquely talented teacher with the ability to "coax" you to success.

Microsoft Project. It makes sure the best laid plans get carried out on schedule.

#### Microsoft Mouse.

When pointing is quicker than typing.

The new Microsoft Mouse is designed to exploit fully the abilities of Microsoft Word and Windows, Microsoft Project and Multiplan 2.0. If you use programs like Lotus 1-2-3, WordStar, DisplayWrite, our Mouse will run them more efficiently.

Take advantage of Mouse mobility to skip through paragraphs, highlight sentences or entire passages. And initiate commands with a mere point-click.

In addition, much of what you are doing by hand today can be automated through our Mouse Menus. Which translate multiple key commands and mouse moves into a one mouse-click operation.

The Microsoft Mouse even includes a free graphic bonus—PC Paintbrush. A color paint program that can liven up any paper presentation.

MS-DOS applications from "MS" itself. For running your PC, your life, or your business, everything you need to know is our name.

After all, most of the world's computers take their instructions from us. When you're shopping for software, so should you.

# Microsoft

The High Performance Software™

For the name of your nearest Microsoft dealer, or to get upgrade information, call (800) 426-9400.  
In Washington State and Alaska, (206) 828-9088. In Canada, call (800) 387-6616.

Microsoft, MS-DOS and Multiplan are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation. ReadIt! and ThinkTool are trademarks of Living Videovision. Inc. IBM is a registered trademark of International Business Machines Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

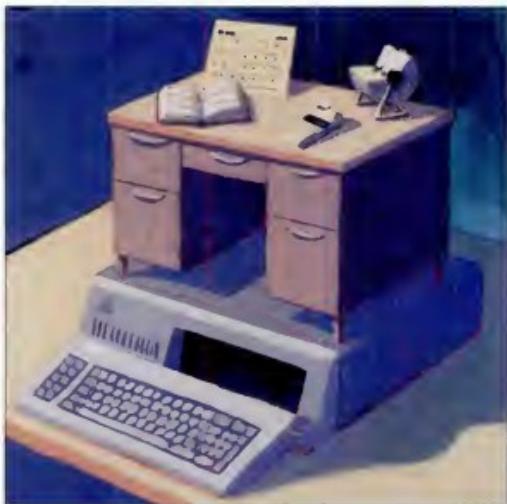
Dow Jones News/Retriever is a registered trademark of Dow Jones & Company. CompuServe is a registered trademark of CompuServe Incorporated. MCI Mail is a registered service mark of MCI Communications Corp. Easy Link is a service mark of the Western Union Telegraph Company. QMAG is a registered trademark of Official Airline Guides, Inc. NewsNet is a registered service mark of NewsNet, Inc.

PC Paintbrush is a trademark of ZSoft.

WordStar is a registered trademark of MicroPro International. Corporate DisplayWare is a registered trademark of International Business Machines Corporation. VisiCalc is a registered trademark of VisiCorp.

# THE ORGANIZING PRINCIPLE

*These days, a desktop organizer is often part of a successful executive's gear. But the similar features these programs offer make finding the right one a very personal choice.*



*HomeBase* and *PolyWindows DeskPlus*. By no means, however, do these two complete the list. *PC Magazine* will review other organizers as they come our way.

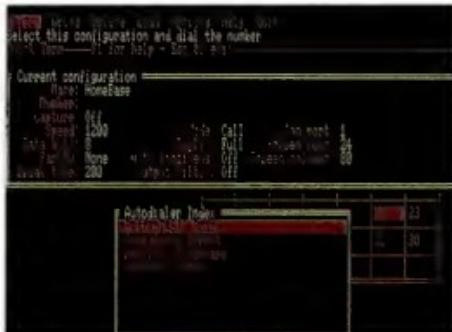
**WHAT THEY DO** Most organizers provide four basic features—a linear database of some sort (sometimes mimicking the paper Rolodex system), an on-screen calculator, a calendar/appointment book, and an editor. Some add ASCII reference tables for programmers. Others add terminal emulation and background communication. All of these

ost of you out there acquired your PCs to help you find better, more efficient ways of performing your daily business tasks. And while all the software manufacturers claim increased productivity and efficiency, all too few of these products actually belong to that wonderful class of software that performs truly useful tasks in innovative ways. The first spreadsheets did this; they enabled number workers to approach their chores in such an entirely new and efficient fashion that the software actually changed the nature of their jobs and brought with it a sense of excitement.

If there's another product category that belongs right up there, it's desktop organizers. These truly useful tools can actually help you to work better and smarter.

The organizers—perhaps better termed “multifunction resident utilities”—are proliferating. The first, and most successful, was Borland's *SideKick* (see “It's About Time: 15 Real-Life Productivity Solutions,” *PC Magazine*, Volume 4 Number 24). Here, we look at two others:

## ■ TWO DESKTOP ORGANIZERS



When you call HomeBase's modular desktop utilities, they replace the application you are currently in on-screen. Pictured here are the communications and calendar modules.



PolyWindow's DeskPlus lets you call up windowed desktop modules including a calendar, notepad, and various DOS services from within applications programs such as WordStar.

functions are resident in the background and can be called at any time to the foreground for instant operation without disturbing the current application.

The basic functions among the programs are so similar that what matters most in comparing them is not the actual features but the ways in which they implement the procedures. Some use roll-down menus; others, overlay screens. Some are suited only to large-memory machines; others are modularized to enable subsets of features to be loaded when memory is critical. Since the differences lie in form rather than substance, the appropriate choice of an organizer is a personal one.

**HOMEBASE** Amber Systems' *HomeBase* is a remarkable piece of software at the remarkable price of \$49. This product is the brainchild of a group of marketers and coders who got their start at Borland International, and the company's legacy is highly evident. *HomeBase*, however, is so elegant that it has one up on *SideKick*. One way to look at it is to say that Borland's product is a first-generation organizer, while Amber's is second or third generation. It delivers the most bang for the buck among desktop organizers.

*HomeBase* will run on a 256K machine with a couple of floppy drives, but it's really designed for big memory (512K and above) hard-drive computers. That makes sense in view of its extensive DOS services

and the fact that it occupies 175 to 178K when resident in memory (and, to be really useful, that's all the time).

Installation of *HomeBase* is a snap. Its own installation program not only transfers *HomeBase* program elements and files from the unprotected distribution disk, but also edits existing CONFIG.SYS and AUTOEXEC.BAT files to include *HomeBase*-related instructions. It works with virtually every available program, though XyWrite and SmartComm II are two exceptions. *HomeBase* works fine with ProKey or SuperKey. You must take care to stack the various elements correctly in AUTOEXEC.BAT.

Once installed, *HomeBase* is present to be called while just about any other program is active or to perform communications tasks quietly in the background while other programs are working.

Primary *HomeBase* functions include DOS services, linear database services, editor/word processor, calendar/appointment book, terminal communications, calculator, and cut-and-paste operations.

The key combination Alt-Shift-H brings up *HomeBase*'s main menu, which lists major options:

- Calculator (Alt/Shift/=)
- Calendar (Alt/Shift/C)
- DOS Services (Alt/Shift/D)
- Notebase (Alt/Shift/N)
- Quick-Term (Alt/Shift/Q)
- Cut (Alt/Shift/K)

You can select the desired function using a smart cursor or by pressing the indicated key combinations. Minihelp is displayed at all times on the prompt line, and textual, context-sensitive help is always available by pressing F1.

**CALCULATOR** The "scientific-type" calculator has 26 memory variables, a "tape" that can be saved or pasted into other work, and a feature that enables you to cut a column or row of numbers from any other program screen and move them into the processing area. Math can be done in decimal floating point or hex. Conversions are instantaneous.

**CALENDAR** Any number of calendars can be maintained simultaneously so that an office secretary, for example, can keep

**PC**  
MAGAZINE

**F A C T F I L E**

**HomeBase**  
Amber Systems  
1171 S. Saratoga-Sunnyvale Rd.,  
San Jose, CA 95129  
(408) 996-1883  
Price: \$49 (not copy protected)  
Requires: 256K RAM, dual floppy drives, modem.

**CIRCLE 688 ON READER SERVICE CARD**

## ■ TWO DESKTOP ORGANIZERS

separate appointment calendars for everyone in his or her operation. A query facility enables you to respond to such questions as: "When did Joe, Paul, and Mary have lunch together?" or "Give me a list of any time anyone in the office had a meeting with Customer Jones," or "Total my expenses for the day (week, month, year, period) and move them over to the word processor so I can write an excuse for the boss."

The daily calendar view divides the screen into two sections: appointments for the day and to-do today. Appointments can be annotated to any length, and the to-do list can roll forward to tomorrow (or any other future date) those items that you just didn't quite finish today.

A weekly view shows a week's worth of days, each with a column of highlighted hours representing appointments. Cursor up, down, left, right, and PgUp and PgDn keys are used extensively to zoom in and out of the various calendar levels.

In fact, all menus are reminiscent of Lotus's 1-2-3 or Microsoft's *Multiplan*; a list of all possible selections appears at the top of the screen with the default selection highlighted. You can tab across the list highlighting and entering the options in turn, or you can simply hit the first letter of the desired selection.

**DOS SERVICES** The DOS services facility opens up with a single window and a list of functions. These enable you to view up to four different directories simultaneously and to mark files for copy, erase, or move operations. Additionally, you can make and remove subdirectories, rename files, view files in a display mode, or edit files with the *HomeBase* internal editor. (Editor commands use the *WordStar* control format.)

Subgroups of files can be selected (sorted) by pattern (\*.\*)<sup>\*</sup>, name, extension, or date. Files can be manipulated one at a time or in groups. In either case all operations are visible to you. This, I believe, is the shell that DOS should have had originally.

**DATABASE SERVICES** *HomeBase*'s database services are very powerful, enabling you to maintain Rolodex-type files, index card records, message records, or, in

fact, any form you wish to create. (Included in the *HomeBase* package is a form template maker and report writer used with the system's linear database system.) There is no software limit on the number of databases that can be maintained. *HomeBase* even has a mini query language for instantaneous retrieval of data through field comparison.

**TERMINAL SERVICES** *HomeBase* includes a smart terminal package that allows uploading and downloading (start/stop or Xmodem) and fully automatic operation. It also functions as an autodialer for voice communications.

In the autoanswer mode, *HomeBase*'s terminal function entirely in the back-

### ■ Each of *HomeBase*'s services could make it in the marketplace as a full-featured standalone product.

ground while you work on something else.

For example, suppose you are working in 1-2-3 when a call comes into the computer—your partner with a file to upload. *HomeBase* will answer the call and notify you (in the 1-2-3 screen) that it has done so. Your partner can upload his file while you stay in 1-2-3, or you can duck out of the spreadsheet, communicate with the caller, and then return to the spreadsheet without dropping a character.

**OVERVIEW** This is one of those rare software offerings that you have to see to believe. Each of *HomeBase*'s services—editor, database, calendar, calculator, and terminal—could make it in the marketplace as a full-featured standalone product with price tags over \$49.

However, these packages don't stand alone. They reside in memory, work synergistically, and are available for immediate call no matter what you're working on at the top level.

*HomeBase* is written in C and assembly language. Its source code has over 100,000 lines—an obviously expensive effort in a highly competitive field.

Don't be deterred by *HomeBase*'s modest price. This package would be a bargain at twice the cost.

**POLYWINDOWS DESKPLUS** Polytron Corp. has taken a unique approach to the development of desk organizer software—a modular strategy that affords you maximum flexibility in choice of services.

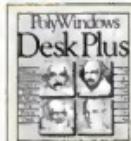
The basic Polytron product is called *PolyWindows DeskPlus*. It provides a DOS shell, text editor, calculator, database services, calendar/appointment books, autodialer, cut and paste, keyboard macros, screen saver, and an ASCII table. Typically, *PolyWindows* uses about 70K bytes of RAM, so it is barely functional in a 256K machine, but it really shines in a beefier RAM environment.

Unique in the Polytron approach is that each of these services (and several others in development) comes as a module that is loaded into memory (at your option) through a .BAT file. This system enables you to create several different resident programs and to load the one you want at the beginning of a computer session, thus reserving a maximum of memory for the tasks at hand.

Having separate modules also allows Polytron to be a bit more extravagant with code size in each module. The larger code size makes *PolyWindows* graphics displays fancier than most in this class of software, and the functions themselves are more complete.



### F A C T F I L E



**PolyWindows DeskPlus**  
Polytron Corp.,  
P.O. Box 787  
Hillsboro, OR 97123  
(800) 547-4000  
**Price:** Copy protected,  
\$49.95; not copy  
protected, \$84.95

**Requires:** 256K RAM, DOS 2.0 or later,  
one double-sided disk drive.

CIRCLE 694 ON READER SERVICE CARD

## ■ TWO DESKTOP ORGANIZERS

The modules fit into a command shell that is highly intuitive and makes extensive use of roll-down menus and context-sensitive help. You can also change window colors and window sizes, and stack windows as desired.

**RESIDENT TEXT EDITOR** The *PolyWindows DeskPlus* resident editor is a good example. Far from being merely a notepad, this resident editor is a full-blown word processor that can handle a 64K-byte text file (about 42 typewritten pages). The text editor can display up to 16 windows simultaneously, representing 16 different files or 16 views of a single file.

All customary word processor control features are present, including block moves, undelete, file merge, word wrap, and global searches and changes. Context-sensitive help is available at all times, and most complex features are selected from pull-down menus.

**CALCULATORS** *PolyWindows DeskPlus* has not one but three calculators. It's up to you to insert the one you want to use in the start-up batch file.

The standard general-purpose calculator presents a graphic image of a pocket calculator on the screen with a clear representation of corresponding keys on the PC (or AT) keyboard. A "tape" is available to keep track of operations, and any answers can be moved to other work inside (or outside) of *PolyWindows*. This calculator handles addition, subtraction, multiplication, division, and percentage computations. You can choose fixed or floating point.

A "small" calculator can be installed optionally. This features a smaller graphic display so that you can see more of the work being overlaid.

Finally, a programmer's calculator is available that operates in any of four number bases—decimal, binary, octal, and

hexadecimal. The ASCII symbol for the result is displayed, as well as the mnemonic name for the first 32 values.

**DATABASE SERVICES** The *PolyWindows* database services are called an "electronic Rolodex." The name is apt enough in that each data entry form looks like a Rolodex card on top of a stack. The tabs of previous cards with their alphabetized entries are always visible, since *PolyWindows* automatically maintains their organization and sorted order.

Up to 16 "decks" of cards can be maintained simultaneously. Cards can contain a single line or an entire screen. You can print a single card or an entire deck.

### CALENDAR/APPOINTMENT BOOK

The calendar/appointment book divides the screen in half—the left side for the time/calendar functions, the right side for the 8 a.m. to 8 p.m. appointment book.

## UNBELIEVABLE PRICE! WHOLESALE PRICE TO THE PUBLIC!

100% IBM XT® COMPATIBLE

\* 1 YEAR WARRANTY ON ALL SYSTEMS \*



### COMPLETE MONOCHROME SYSTEM, \$965

2 DRIVES DS/DD, 256 K. MONOCHROME  
MONITOR, MONOGRAPHIC CARD (HERCULES COMPATIBLE)

FOR OTHER CONFIGURATIONS CALL FOR

BEST PRICES YOU WON'T BELIEVE!

### SPECIAL OF THE MONTH!

10 MB HARDISK (SEAGATE W/CONTROLLER)	\$495
20 MB HARDISK (SEAGATE W/CONTROLLER)	\$595
MULTIFUNCTION CARD	\$119

CIRCLE 325 ON READER SERVICE CARD

ATLANTIC COMPUTER SYSTEM (213) 720-1461  
2260 S ATLANTIC BLVD., #F MONTEREY PARK, CA 91754

# DISK MECHANIC™

The ULTIMATE Backup, Analyze & Repair Utility  
The Disk Toolkit NO IBM PC Should be Without  
Protects Your Software Investment

### BACKUP TOOLS:

- Can Backup Most Every Diskette
- SUCCEEDS where others fail
- Works Manually or Automatically
- Create "Protected" Diskettes
- Many Additional Analysis Tools

### SECTOR TOOLS:

- Examine/Print Sector Data
- Modify (ZAP) Sector Data
- Compare, Copy & Zero Sectors
- Search Sectors For Data

DISK MECHANIC works with all standard IBM PC disk formats including "protected" diskettes with mixed track and sector sizes, blank and high track formatting, CRC errors, and single or double sided drivers. DISK MECHANIC requires an IBM PC with 128K of memory or COMPAQ with 192K of memory, DOS 1.3, and floppy disk drives. DISK MECHANIC includes a detailed 46 page instruction manual. To Order DISK MECHANIC send check or money order for \$76 plus \$3 for shipping (Mass., res., add sales tax if applicable). MLI MICROSYSTEMS, Box 825, Lexington, Mass. 01731 or Call (617) 826-2040 for Mastercard or VISA orders. Dealer/Distributor inquiries welcome. • 1-800-MLI MICROSYSTEMS.

### FILE TOOLS:

- Show Disk & File Allocation
- Display & Alter File Bits
- Repair Damaged Disks
- Receive Erased Files
- Alter "Hidden" Status
- Search Files For Data

### HACKER TOOLS:

- Modify Floppy Disk Controller Parameters
- Supports All FDC R/W Commands

MLI MICROSYSTEMS

CIRCLE 344 ON READER SERVICE CARD

## ■ TWO DESKTOP ORGANIZERS

The appointment book features an "alarm clock system" that calls you from any outside operation by overlaying a message on your current work area. Pressing Esc gets rid of the message. And if you really are a time nut, the alarm clock will chime in each new hour for you.

You can have a number of appointment books—one for each person in the office, for example, so that appointments and trips can be scheduled from a central point.

**AUTODIALER** The *PolyWindows* autodialer is designed to run with a Hayes-compatible modem. It dials local and long-distance numbers (from the electronic Rolodex) or a number that appears in any document. Alternatively, you can simply type the number to be dialed.

**CUT-AND-PASTE** The *PolyWindows*-cut-and-paste facility is called The Grabber. Like that of similar systems, it enables you to import and export data between your current programs and between the *PolyWindows* features.

**KEYBOARD MACROS** PolyKey is the program's resident keyboard macro facility. Like other Polytron modules, PolyKey is as powerful as some standalone software products that offer similar services.

PolyKey enables you to create up to 16 different keyboard sets, each of which can redefine up to 60 keys that could represent up to 2,500 keystrokes.

The macro sets can be loaded into memory and then selected from pull-down menus. When one set is selected, it overrides any set in use.

**DOS SHELL** The *PolyWindows* DOS shell uses pull-down menus to ease seven DOS functions—change directory, make a new directory, check disk space, erase a file, list files, read a file, and rename a file. This is one of the few areas where *PolyWindows* seems to fall a bit short of the competition, but keep in mind that *PolyWindows* is really designed for semi-professional computer users who probably know their way around DOS anyway.

**ADD-ON FEATURES** I mentioned at the beginning that *PolyWindows* is unique in its modular growth concept. At present,

the list of add-on tools includes The Archivist, The Cryptographer, PolyWindows Talk, and PolyWindows Debugger.

The Archivist is a memory-resident document storage and retrieval system with data security and data compression facilities. Once files are compressed and stored in volumes (one volume per floppy, 250 files per volume), files can be recalled by keyword, date range, document name, or original disk filename. The system includes password protection (by volume).

The Cryptographer can encode any kind of file, including a text file, a spreadsheet, or a database, making it unreadable to anyone who doesn't know the password. Each file can have its own password.

PolyWindows Talk is a resident communications package with VT100 terminal emulation and script operation similar to *CrossTalk*. It supports start/stop or Xmodem file transfer protocols. It can function automatically in the background while you are using another program or can be used as a standalone communications package.

PolyWindows Debugger is an advanced programming tool that can be called at any time to analyze a program running in the foreground. It can single-step through a program while displaying code in binary, hex, or assembly language. In fact, it disassembles as the program runs so you can see exactly what's going on. You can set multiple break points and perform hex arithmetic and block moves.

The Archivist costs \$49.95; The Cryptographer, \$49.95. PolyWindows Talk runs to \$79, and PolyWindows Debugger weighs in at \$99.

**CONCLUSION** Overall, because of its modular construction and modular approach to the market, *PolyWindows* is a very different system from either *HomeBase* or *SideKick*. Although *HomeBase* left behind hooks in its code for "possible add-ons," *PolyWindows* is designed to be added to as the product line matures. Both are easy to use; the differences are so subjective that your ultimate choice of product is a personal one. ■

*Richard Aarons* is a contributing editor of PC Magazine and a senior editor at Business and Commercial Aviation magazine.

## Try It. Then Buy It. PC-Write.™

A fast, full-featured word processing package for the unbelievable price of \$10. Complete. You get a manual on disk, mail merge, split screen, keyboard macros, on-screen formatting, full printer support, and more.

Try *PC-Write* for \$10. Then register for \$75 to get:

- latest diskette
- printed manual
- two updates
- phone support
- newsletter

Registration supports our "shareware" concept that keeps our prices low, and allows our development of *PC-Write* enhancements.

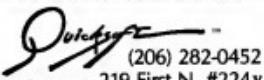
Shareware means you can get *PC-Write* from a friend or user group to try, and give away copies yourself. Then register if you like it. No risk!

PC Magazine  
Feb 11, 1986



We expect our latest version 2.6 soon, with a completely rewritten manual and easy-to-use menus, plus proportional spacing and automatic reformatting. Circle our bingo number for info.

**Order PC-Write Today.  
Satisfaction Guaranteed.**

  
(206) 282-0452  
219 First N. #224v  
Seattle, WA 98109  


**TCS****TEXAS COMPUTER SYSTEMS**Toll Free **1-800-433-5184** Texas 214 264-8511

Mail Order Computing Since 1980 • D &amp; B Rated • Major corporate PO's accepted.

Heart of Texas  
Computer Systems, Inc.  
P.O. Box 531198  
Grand Prairie, Texas 75053FREE  
Software Bonus  
With Each Drive Kit**HARD DISK SYSTEMS**

FREE with each kit: the powerful WindowDOS Utility Software giving instant access to many DOS functions, plus head parking. \$50 value.

PC &amp; XT Half Height.

PC &amp; XT High Performance Full Height.

10 Mg **\$379**CMX  
18 month warranty  
Seagate  
13 month warranty20 Mg **\$469**20 Mg **\$695** **\$749**  
30 Mg **\$795** **\$895**

Kits include drive controller cables, hardware &amp; easy instructions. Systems are individually tested and packed by our warranties of 13 or more months.

For combo  
floppy/hard drive  
controller, add \$75.

High performance drive kits include full height drive controller cables and instructions. Outstanding sonic cap technology provides quality performances and 40 ms average seek time. Drives require 135 watt power supply.

**Multifunction Card \$129**

- 384K Memory
- Clock/Calendar
- Battery backup
- Parallel, Serial, & Game Ports
- RAM Spooler & RAM Disk Software

**Monochrome Card \$119**

- Emulates IBM Mono Card
- Hercules compat
- Printer Port

**Color Card \$119**

- Fits 5" slot, emulates IBM RGB card

**Everex EDGE \$279  
Graphics Edge \$299**Color and Monochrome  
Do Everything  
Graphics Cards.**New High Performance  
TCS TURBO PC****\$795** 4.77/8 MHz  
TURBO

- 640K Memory on Mother Board
- 2 speed operation, keyboard selectable
- One 360K Floppy Drive
- Floppy Drive Controller
- Eight expansion slots
- 135 watt Power Supply
- Keyboard

Dealer  
information  
availableRUNS 10 to 20% FASTER  
than other dual speed PCs.  
Available in various configurations.**PRINTERS**

FUJITSU DotMax 9	\$349
DotMax 24	\$1295
PANASONIC 1080	\$225
1092	\$359
1093	\$420
3151 (DW)	\$412
JUKI 6100	\$359
6300	\$679
STAR SG-10/15	\$219/379
OLYMPIA NP	\$245
RO Daisylane	\$289

**MONITORS**

RGB Ultra Hi Res	\$399
13" anti-glare screen, 31 dot pitch, outstanding graphics	
RGB Hi Res.	\$349
13" multipurpose color monitor, 43 dot pitch anti-glare screen.	
Green Screen TTL	\$129
Looks and works like IBM mono monitor 12" anti-glare, high contrast screen.	

**MODEMS**

100% Hayes compatible	
EVEREX Internal	\$225
300-1200 Baud, w/software	
ANCHOR Express	\$275
Mark 12	\$219
Volksmodem 12	\$179
Volksmodem (300)	\$49

**TAPE BACK-UPS****INTERNAL**

10 mg	Everex	\$399
20 mg	Everex or Genie	\$699
23 mg	Microsystems	\$699
60 mg	Everex or Genie	\$888

**EXTERNAL**

20 mg	Everex or Genie	\$749
25 mg	Microsystems	\$849
60 mg	Everex or Genie	\$1095

EMERGENCY POWER SYSTEMS	
200 watt (10 min)	\$269
200 watt (35 min)	\$449
425 watt	\$899
1000 watt	

**PC POWER SUPPLIES**

135 watt	\$89
150 watt	\$119

Quantity Discounts Available.

**\$49.95****WindowDOS****DOS Utility Software!**

Pop-up windows give you instant access to many enhanced DOS functions from inside the program you are running. And return you instantly to where you started.

**CALL**

1-800-433-5355

Brand names listed are registered trademarks. Sales are final. Returns for repair require authorization number. Prices, specifications and availability are subject to error or change without notice.

\* \$100 minimum purchase required.  
\* All merchandise is new, with manufacturer's warranty.  
\* We accept cashier's checks, money orders, VISA, MC, C.O.D., and approved corporate PO's. For American Express, add 3%.

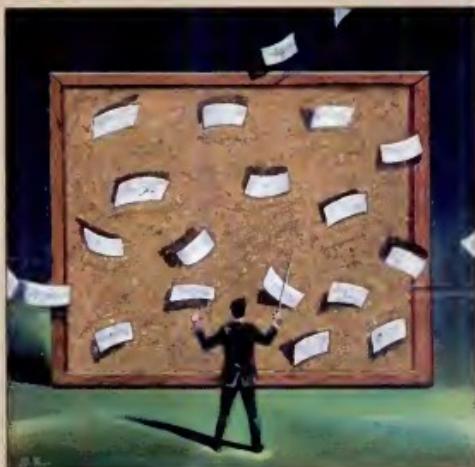
- We have lowest prices. Compare.
- No surcharge on VISA, MC.
- Prompt shipping. Free on many items. Call.
- Finest service! Your full satisfaction is our goal!

## Project Management Software: THE TOP SELLERS

It's February 11. Do you know where your project is?" If you don't know the answer, don't be too hard on yourself; you're not alone. Typically, none of us has the time in our busy schedules to stay on top of every detail in a complex project. Unfortunately, though, these details add up to whether or not your project gets completed on time. And when you are responsible for meeting that deadline, you had better know just what pieces could derail the project schedule and result in your reassessment as branch manager of the Timbuktu office.

Most people don't manage project schedules simply because it takes so much time. Once you map out all the tasks, you still have to figure out the schedules and calculate which tasks must be completed on schedule and which can slide. Then comes the task of presenting all this information (usually with 3 by 5 cards taped to a wall) so that you can see how it all fits together. Of course, you have to go through much the same procedure when you need to make a midstream adjustment when you get behind (or perhaps even ahead of) schedule.

As you are probably aware, your PC stands ready and waiting to take over much of the drudge work involved in managing a complex project. Project management software can help you keep your different tasks in order, produce Gantt and PERT charts to guide you through the project, and even make sure that



*Managing a complex project means staying on top of all those niggling details with the right scheduling and graphic tools.*

you don't schedule one person to work 16 hours a day (unless, of course, you want to). The program takes over the jobs of keeping the lists of tasks and calculating all the dates and workloads, leaving you to see that the schedule is met.

These programs make project management easier, but they still don't make it easy. You must plan out the different elements thoroughly and keep your expectations realistic. If you use the program to track performance against the schedule, you must take the time to enter the data as the project progresses. Like most computer applications, the savings come with the speed of the calculations and the ease of making revisions. Many of the packages reviewed here even let you save a typical project and then modify it for a specific set of circumstances.

**SIX SCHEDULERS** *PC Magazine* decided to take a look at a half dozen of the more popular, best-selling project management programs. In each brief review, we present some of the highlights that set one product off from its competition, either for better or worse. They are presented here in ascending order by list price, not necessarily in ascending order of value.

As you read the following minireviews, keep in mind that not all programs are suited for the same kinds of projects. Some are best for simpler projects, while others are capable of handling more-complex problems. The right selection depends in large part on what you are trying to track.

## ■ PROJECT MANAGEMENT SOFTWARE

**MICROSOFT PROJECT** Microsoft Project is the least expensive package in the group and certainly one of the best bargains. While it is not as sophisticated as some of the others, it has the strength to do what must be done in most cases. You enter the tasks at the bottom of a Gantt chart display, and you can specify up to eight different resources per task. If a resource is overextended for a given time period in the plan, the program will let you know. You may then choose the Autoschedule command, which will quickly "smooth" any resource and adjust the task schedule accordingly. Project goes one step further with resource tracking by offering a report that prints a page for each resource category, listing the different tasks and their scheduled start and end dates. This is a handy format because you can hand the pages out to the individuals responsible for each resource and it spells out all they need to know about the project schedule.

You are limited to a mere 128 tasks per project, so you should not choose this program for your next interstate highway bridge project. You can incorporate other projects as tasks within a project, but each is treated as a single task, and no information is carried over about the resource requirements. On the other hand, if you are dealing with projects that have similar, repetitive tasks, you can create a template plan and reuse it as often as you need.

Not surprisingly, Project comes with all the Microsoft earmarks we have grown to expect, from its clear plastic slipcase that doubles as a bookstand to the *Multiplan* menu structure. As with the other Microsoft products, you use the Tab key or Space bar to highlight menu options and

## EVALUATING THE SOFTWARE

*PC Magazine's reviewers tested each of the packages reviewed here by duplicating real-life situations.*

To test each package, we first ran through the tutorial and the manual to become familiar with the program's approach to project management. We then entered a simple, 35-task project that simulates the opening of a branch store. We tried to use that first project as a template to create a second, similar project scheduled to start 1 month later and schedule the two projects side by side. We chose this approach because we believe it is most similar to the way people would use the software; you develop a generic project that you can quickly call up and modify. From here, you enter new information and can quickly see

what effect it has on workloads and deadlines. We looked at how well the program handled the sample task. How easy was data entry? Did the program have a way to "smooth" overextended tasks, or did we have to do that manually? How quickly and easily did the program respond to changes, and what charts and tables would it create? Could you get separate listings of tasks for individual resources, so that you could give project members a list of their tasks and deadlines? We also kept an eye out for special features that might set a program apart from the others.

—Alfred Poor and Bruce Brown

the Tab key to move within fields on option screens. It even supports the Microsoft Mouse if you are suffering from "Mac-Env."

The manual and tutorial are clear and well organized. The tutorial is a series of lessons in the manual that use sample files included on the program disk. The manual has a reference section, a thorough index, and some helpful information about project planning and the accounting conventions used in the calculations.

A few of the other nice features include the ability to sort the tasks in a variety of ways, such as by critical path and by start or end date. I found the sort by late start date to be the most attractive and useful feature. Another nice surprise was that the Gantt chart printed sideways automatically (using an Epson FX-85), rather than creating a two- or three-page report that is much more difficult to read and use. It also has numerous options for exporting data to other programs.

Project is not without its shortcomings. It has no network diagram. It cannot accept tasks that last for fractional time periods or resource requirements to the hundredth of a unit (it does accept tenths). It does not track projects through various stages of partial completion; you would have to

modify the plan to reflect the current situation and would lose the details of the original schedule.

Like most of the other programs reviewed here, Project is copy protected. It does have a procedure that permits you to install the program on a hard disk and run it without the floppy key disk. Unfortunately, there is no uninstall procedure, so that you cannot take it off your hard disk when you want. If your hard disk should fail, you have lost your installed version. True, you can then revert to using the key disk, but that seems to be an unnecessary hassle.

Overall, Project is a great place to start. It isn't as powerful as some of the competition, but then again, it may be all that you need. It is available at a price that lets you get involved in serious project management at a low cost, without risking too much in case it turns out that project management is not for you.

**COMPUTER ASSOCIATES' SUPER-PROJECT** Computer Associates' Micro Products Division is the new name for Sorcim/IUS, a company that is well known for its *Super* family of products, including *SuperCalc3*. *SuperProject* is its standard bearer in the project manager market.

Unlike most of the programs we re-



### FACT FILE



Microsoft Project,  
Version 1.02  
Microsoft Corp.  
10700 Northup Way  
Bellevue, WA 98009  
(206) 828-8080  
List Price: \$250  
Requires: 128K  
RAM, one doubled-

sided disk drive.

CIRCLE 665 ON READER SERVICE CARD

viewed, with *SuperProject* you define a project by placing tasks on a network chart instead of filling in a table or a Gantt chart. You create a task and specify its duration and required resource, and then you define the links between the different tasks. Note that you can only specify one resource per task on the network display; this is the "lead resource," but you may specify as many secondary resources as you wish on a separate table.

All of *SuperProject*'s functions can be accessed in either of two ways. The first causes pull-down submenus to appear from the top-row commands on the screen. Select the appropriate choice, and the command is executed. You can also bypass the menu process entirely, using function keys and Ctrl or Alt key combinations.

After you have defined your tasks, you can adjust the layout by moving them around the screen, either singly or in groups. *SuperProject* calculates the critical path based on the links you establish, and you can view it on either the network or Gantt displays. While it is nice to have the artistic control of being able to place the tasks where you wish, this undertaking is time-consuming. Some of the automatic drawing routines of the other programs do a better job of placing the tasks.

One of the nicest aspects of this program is the high level of customization built into the system. There is an entire screenful of "preference" settings, cover-

## ■ SuperProject deserves special mention because it is not copy protected. There's no special installation procedure—just copy the files and go.

ing everything from the type of monitor and the units of time measurement to the timing of the automatic save feature that saves your work to disk at fixed time intervals while you are working.

Computer Associates has given you a choice other than the traditional tutorial in the manual (14 lessons), which covers nearly every aspect of the *SuperProject* program. For the more adventurous or those with some experience with project management software, there's the "10 Minutes to *SuperProject*" booklet. This is a 22-page pamphlet that exposes you to the program's basic operations to get you off to a fast start.

The program deserves special mention

because it is one of the two packages reviewed here that is *not* copy protected. There's no key disk, no special installation procedures—just copy the files and go.

The package includes the printer utility *Sideways*. *Sideways* permits you to print tables and graphics running down the long dimension of the page, thus creating tables that are two or more times wider than standard printing can produce. While this appears to be a bonus, it has a major shortcoming. You must create your report with *SuperProject* and save it to disk, then leave the program, call up *Sideways*, and then (finally) print the report. You must return to the original program to continue work. To top it off, you must tell both *Sideways* and *SuperProject* about your printer in separate configuration procedures. If they are going to package the programs together,



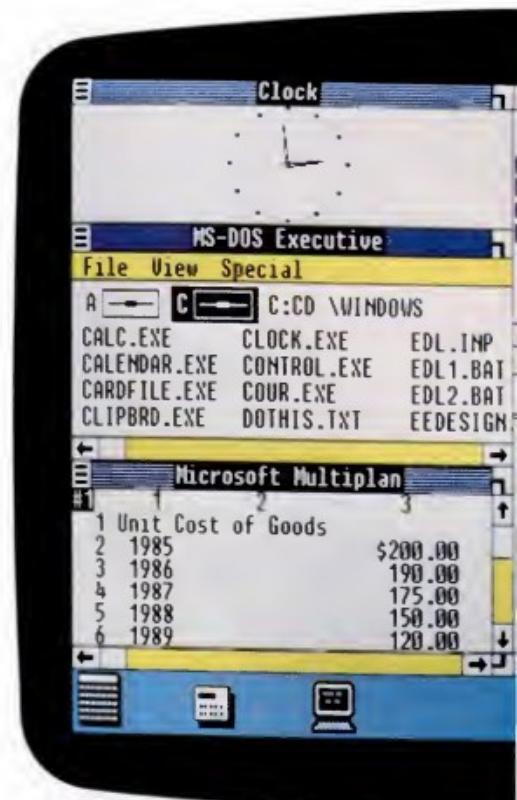
The Microsoft Project Gantt display is straightforward, showing the critical path.

PC MAGAZINE		FACT FILE	
		<b>SuperProject, Version 1.10</b>	
		Computer Associates	Micro Products Div.
		2195 Fortune Dr.	San Jose, CA 95131
		(408) 942-1727	List Price: \$395
		Requires: 256K RAM,	DOS 2.0 or later.
CIRCLE 864 ON READER SERVICE CARD			

Preferences		SuperProject	
Screens		Commands	Projects
Beep	On/Off	Normal	Long Short
Blinking	On/Off	Normal	On/Off
Configure Exit	Yes/No	Configure Exit	Yes/No
Configure Delete	Yes/No	Configure Delete	Yes/No
Date Format	11-12-95 12-13-95 12Nov 95	Date Format	11-12-95 12-13-95 12Nov 95
Default Font	Monospaced	Default Font	Monospaced
Screen	Monochrome Color/BW graphics	Screen	Monochrome Color/BW graphics
Monochrome	Hold/None/Toggle	Monochrome	Hold/None/Toggle
Actual Dates	On/Off	Actual Dates	On/Off
Highlight	Monochrome on Gantt: Yes/No	Highlight	Monochrome on Gantt: Yes/No
Allow Date Entry	Yes/No	Allow Date Entry	Yes/No
Save After	8 Minutes	Save After	8 Minutes of Inactivity
Save After	8 Minutes	Save Screen After	8 Min. Inactive
Transferring		Transferring	
Project Prefix:		SC2/SC3 SC3-Bal12 CSU Printer	
Project Suffix:		Printer Paper Width (98-254): 98	
Print: Printer Spool Printer Disk File		SCSI	

Using *SuperProject*'s preference screen, you can specify many different details to customize the program to your personal tastes.

# Introducing PC



Microsoft® Windows has arrived.

For anyone who uses a computer in earnest, that is extremely good news.

Windows gives you a practical way to integrate programs. It radically decreases the time it takes to move from one application to another. Dramatically simplifies the means of consolidating data from many different programs.

And as a graphical extension of the MS-DOS® operating system, it gives you a highly visual way to work and to organize your work.

In short, Windows brings efficiency to all those processes of personal computing which have till now been awkward, unwieldy, inconvenient.

## The joys of job hopping.

With the advent of Windows, you can work with multiple applications. And switch from program to program with ease.

Start up with one application, then another, and another. Leap back and forth between applications as your work routine dictates. Then pick up right where you left off.

The ability of Windows to change quickly from program to program logically and naturally magnifies the utility and productivity of the personal computer. And is a recognition of the way people who exploit the power of PCs really do their jobs.

## Breaking the 640K barrier.

Just like you, Microsoft Windows can handle several projects at the same time. Juggle assignments. Deal with frequent interruptions.

And Windows will ignore the 640K limit of the PC, especially if you have a hard disk, the Intel® Above™ Board, or expanded memory. It will execute the rather neat trick of working with more programs than

memory can hold at one time.

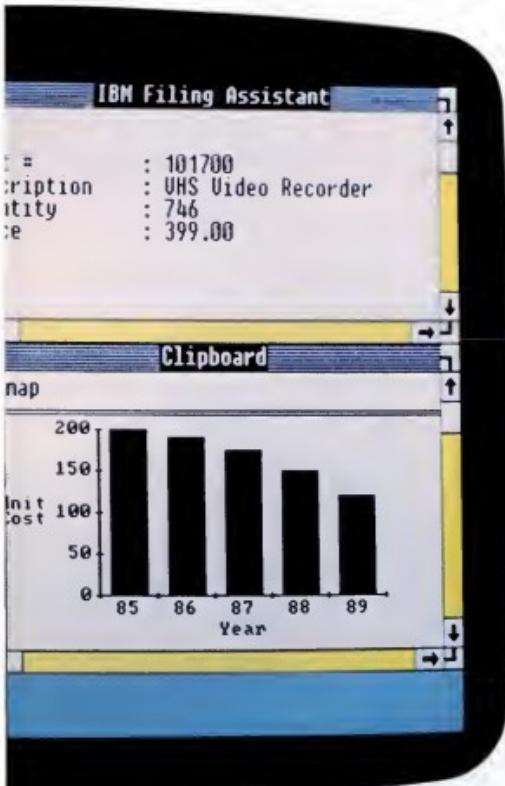
## Spreading knowledge.

Another significant service Windows performs is accelerating the movement of information from one program to another.

Collecting and combining that information is as simple as taking a "snapshot" of data in one program. Editing it. Then consolidating it with data from other programs.

With Windows, you can enjoy the advantages of conventional integrated programs without their compromises. Because Windows lets you put together the applications that you know, and that get a job

# over Windows.



done for you.

Choose your best word processor, spreadsheet, database—you name it. They're all there for you at a keystroke.

### Common ground.

Finally, Windows is not only an immensely powerful tool for today, it's also a solid base for a new generation of Windows Applications.

As an introductory offer, two of these—Microsoft Windows Write and Windows Paint—are included in the Windows package. Along with more than a dozen other Windows desktop applications. Including a DOS file management program, calendar,

cardfile, notepad, calculator, and a telecommunications program.

In Windows Applications you have a common interface which includes drop-down menus, dialog boxes, icons. Along with a richer environment that allows you to mix pictures and text. And to summon different type faces and styles at a keystroke.

Windows is a bridge between today's applications and the graphics based software now evolving. A way to work interchangeably with today's programs. And tomorrow's.

Of course, all this is  
going to cost you: \$99.

A price that makes Windows the most startling value ever offered in software. A comparable collection of programs—a switching program, a graphic interface, desktop applications, a word processor, a drawing program—could easily cost hundreds of dollars more.

If you're someone who uses personal computing as a natural part of your work life, who capitalizes on the productive powers of sophisticated applications, look into Windows.

It offers a new vision of what a computer can do.

## Microsoft Windows

The High Performance Software™

For the name of your nearest Microsoft dealer, call (800) 942-0420. In Washington State and Alaska, (206) 28-8008. In Canada, call (800) 382-6668.

Note: Please check with your dealer to determine if an IBM PC equipped with IBM Enhanced Graphics Adapter Monochrome Monitor and MS-DOS is required.

Microsoft and MS-DOS are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation. Intel is a registered trademark and Above is a trademark of Intel Corporation. IBM is a registered trademark of International Business Machines Corporation.

System Requirements: IBM or compatibles Personal Computer (or 100% compatible) 2MHz memory, two double-sided double-density disk drives (HD10K2 and 3.5 inch recommended), using multiple applications in DOS 3.2 or higher; IBM Graphics Adapter and IBM Color Graphic Monitor Adapter; IBM Enhanced Graphics Adapter; Hercules Graphics Card or compatible.

## ■ PROJECT MANAGEMENT SOFTWARE

er, the least they could do is make them work together a little.

*SuperProject* has high capacities in most areas, but in the case of resources, this is of less use than with other programs. It cannot automatically smooth resource conflicts caused by overscheduling a given resource. It will notify you when such a conflict exists, but you must adjust the start dates of the tasks involved by hand. You can also bring in a second project as required by our test sample, but you need to do a fair amount of editing and adjusting before you can schedule the two projects side by side. Without automatic resource leveling, there is not all that much point in combining the two projects anyway.

In balance, *SuperProject* is a functional product that does not stand out particularly. It has power and flexibility, but this is offset by some awkward procedures and its limitations.

### SOFTWARE PUBLISHING'S HARVARD TOTAL PROJECT MANAGER

What's in a name? *Harvard Total Project Manager* (HTPM) evokes images of somber-suited MBAs strolling through an ivy-draped New England campus. As it turns out, the program is now sold and supported by Software Publishing in California—the *PFS* people.

*Harvard Project Manager* was one of the first hits in the micro project management software market. This product is the advanced version (hence the "Total" in the title), adding features beyond the origi-

nal. *HTPM* has a number of features that set it apart from the others, but not all of the differences are advantages.

The program can use a Microsoft Mouse and has a DIF-format export procedure to transfer your project data to your spreadsheet of choice. It includes numerous views of your project, including Gantt, network, and specific details for individual resources. It can be used to manage projects as well as plan them; you can track the predicted schedule against actual performance.

*HTPM* shines when it comes to report options. You can specify a range of dates for inclusion in the report and enter your own header and footer text. In many cases, you can select an individual resource (or range of resources) to be listed in the report. You can also control the order in which the tasks are presented, specifying up to two sort fields for a report. Provided that your dot matrix printer is supported, *HTPM* even gives you the option of printing your reports sideways on the page.

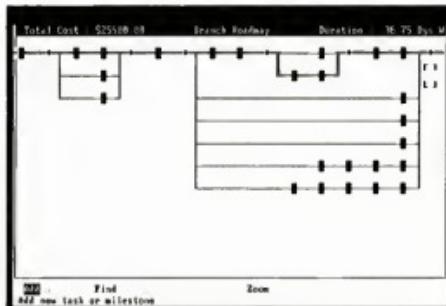
The manual and slipcase are bound in handsome crimson leather (after all, it is named for Harvard) with gilt-embossed lettering. There is plenty of content, neatly presented in a classic type font. Unfortunately, the information is not that well organized and is saved only by a thorough index. The biggest problem is the poor quality of the screen shots; many are blurred to the point of illegibility.

The task entry is done through the network display, which means that you de-

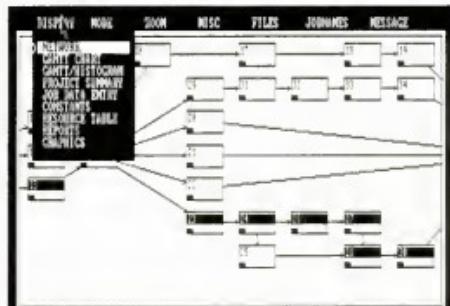
sign the network as you go. Only after you create a task box do you enter the detailed information. This tends to be a bit slower than some of the other programs. *HTPM* is unusual in that whenever your network path branches, you must create a milestone task, which is a task with no duration. While these milestones may add clarity to your project plan, they also add to the effort of building a project.

The program can load multiple projects, such as the two store openings in our test problem and can report on the resource requirements across multiple projects. It can even identify resource conflicts, but that is as far as it goes. It will not level resource requirements, so you have to go through and adjust the schedule manually until the problems are resolved. There is a 200-task limit for each project, which would be constricting were it not for the ability to combine projects.

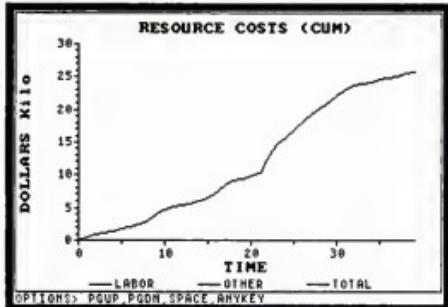
	<b>FACT FILE</b>
<b>Harvard Total Project Manager, Version 1.0B</b> Software Publishing Corp. 1901 Landings Dr., Mountain View, CA 94043 (415) 962-8910 <b>List Price:</b> \$495 <b>Requires:</b> 384K RAM, <b>DOS:</b> 2.0 or later.	<b>CIRCLE 683 ON READER SERVICE CARD</b>



With the Harvard Total Project Manager's zoom feature, you can see the shape of the whole project at a glance.



This is the Project Scheduler Network main screen, showing the network and a pull-down menu of the different display options available.



**Project Scheduler Network** has a graphing capability beyond simple histograms. This shows the projected cumulative costs of the project.

*HTPM* is copy protected, which is a flaw offset by the fact that you may install it to run on a hard disk without the key disk. Like *Microsoft Project*, this install procedure has no uninstall option, so, ultimately, it's an inconvenience.

The tutorial is thorough but is not interactive. You essentially watch information presented on the screen. There are no exercises in the manual to work through, so the most-effective mode of learning seems to be jumping into your project and relying on the manual's index to steer you toward the help you need.

Overall, *HTPM* is a competent, if cumbersome, product. The reports can produce just about any set of information about the project that you might wish. It goes beyond planning to give you project management facilities, but you need to perform resource smoothing and network design by hand, which some other programs will do automatically.

## SCITOR'S PROJECT SCHEDULER

**NETWORK** In a few years, microcomputers have gone from being home playthings to kingpins in the modern workplace. From where we stand, one of the key factors that have led to this rapid rise to prominence is that these machines are highly flexible tools that can be shaped to perform a variety of tasks. As a result, programs that support this flexibility are more likely to prosper than those that are more restrictive than the others.

For the LEFT and RIGHT arrow keys to select a choice. Press ENTER when done.									
		Press ENTER when finished, F10 when done is ok, or F1 for help.							
		Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mo
<b>Monday</b>		8:00am							
<b>Geographic Profile File C</b>									
<b>Market Analysis</b>	Marketing	C							
<b>location Prospects</b>	Best Est	C							
<b>location Prioritized</b>	Marketing	C							
<b>Preliminary Site Area</b>	Architect	C							
<b>Preliminary Site Rec</b>	Real Est	B							
<b>Preliminary Site Req</b>	Real Est	C							
<b>Recalculations</b> <input checked="" type="checkbox"/> Automatic, <input type="checkbox"/> Manual (PP92)									
<b>Resource Leveling</b> <input type="checkbox"/> Yes, or <input type="checkbox"/> No									
<b>Sort by</b> <input type="checkbox"/> Task Start Date, <input type="checkbox"/> Task Name, <input type="checkbox"/> Notes (1), <input type="checkbox"/> Notes (2) :  <input type="checkbox"/> Sound									
<b>Alarm Clock</b> <input type="checkbox"/> Yes, or <input type="checkbox"/> No <input type="checkbox"/> Options Form									
Today: 15-Apr-96 7:00pm									

*One of Timeline's major strengths is that it lets you select options to tailor the program to your needs.*

Scitor's *Project Scheduler Network* incorporates a feature that could be described as gimmicky; it is designed to be run with a mouse. Although you can run the program without one—there is an undocumented keyboard driver that allows you to do so—the company appears to keep this a secret. This mouse feature has been given such priority that it makes the overall product unnecessarily restrictive.

In any case, the bulk of the data entry requires keyboard commands and entry, and the remainder could just as easily have been handled by cursor movement keys. As a result, the program's hardware restrictions come across as supporting a gimmick that has no concrete justification.

If you have a system configured to meet these requirements, other merits of the program are worth examining. One of the program's greatest strengths lies in its reporting features. Since you are able to record the initial project schedule as well as the actual performance, you can produce a host of reports comparing the projected and actual schedules and costs. You can request reports organized by resource or task. Most reports also have a parameter screen, on which you can narrow down the data to be reported, such as just critical tasks or noncritical tasks or tasks falling within a certain range of dates. In this way, the half-dozen report formats serve multiple purposes. *Project Scheduler Network* also has a series of histogram, bar, and line graphs that show resource and cash requirements over time.

uirements for the project. Both reports and graphs can be routed to either a printer or the screen. Many plotters are also supported for the graphs as well.

Tasks are numbered by groups, in a technique called "work breakdown structure." The program can group tasks with similar numbers together to report resources and schedules for the project by larger phases, to give a broader picture than simply by individual tasks.

On the down side, data entry can be a chore using this package. While it is true that the mouse can make it easier to place the tasks on the network diagram, you must switch to another screen to define each task's parameters, and to yet another to define resource requirements. The



#### FACT FILE



*Project Scheduler  
Network, Version 1.1*

**Scion Corp.**

**250 Lincoln Centre Dr.**

Foster City, CA 94404

(415) 570-7700

**List Price: \$495**

Requires 320K RAM:  
MIPS R3000R30000

BM color/graphics or en-  
dored or Monotype mono-

Mount: Mount Systems or

before Version 4.0).

R SERVICE CARD

— 1 —

## ■ PROJECT MANAGEMENT SOFTWARE

mouse is not involved in these screen switches, and the jumping back and forth slows down the data-entry process. Since the critical path is recalculated each time that you change the network diagram and a lag occurs even with a small project, the delay could become significant with a big job. In addition, because you have to design the network yourself, the layout will be as clean or tangled as your skills permit; it might be better to have the program do it for you.

The program not only will not level resource conflicts automatically, it won't even notify you that a resource conflict exists. As a result, you must scan histograms for each resource to find out where they are in conflict (if at all) and then manually adjust the schedule.

If the program did something outstanding compared with its competition, its restrictive hardware requirements and shortcomings could be overlooked. Its reports and graphs are not reason enough, however,

er, and you will probably find one of the other programs to be more useful.

### BREAKTHROUGH SOFTWARE'S TIMELINE

Can a late entry into a software market make a dent in the lead of the established programs? *I-2-3* didn't let *VisiCalc* scare it away, and *WordPerfect* was not the result of people's deciding that *WordStar* had the market sewn up. Breakthrough Software's *Timeline* may not be in the same league as *I-2-3* or *WordPerfect*, but then again, it might.

Certain parts of the program are a bit rough around the edges. The network diagrams are spartan and functional—strictly short on flashy graphics. The program does not have a sideways printing mode but instead explains how to create a print file for use with a utility that you might own that can print sideways. On the printout of the Gantt chart, you must rely on a C in a lefthand column to tell which tasks are on the critical path. None of these flaws are

fatal, although they can be annoying.

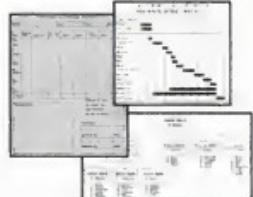
Other features of *Timeline* make these few shortcomings more forgivable. At the top of the list comes the ease of task entry. You work from a Gantt chart display and call up a task form by adding a new task or editing an existing one. In addition to the standard task name, duration, and resource assignments, you can enter up to two lines of notes to code tasks for reporting purposes and to record comments. You are not limited simply to days in the duration and assignment of resources. If you choose, you can plan your project requirements in terms of minutes.

After you have defined the tasks, dependencies are easy; just point to the predecessor, point to the successor, and link, all on the Gantt display. You can also turn off the automatic recalculation of the critical path, and the program will prompt you when the project needs to be recalculated. Unlike any of the other programs here, you may define a dependency with either an

### Project Management Software at a Glance

Product name Manufacturer	List price	Copy protected	Memory required	Memory recommended	Hard disk required/recommended	Listed for \$40K	No. of tasks per project	No. of resources per project	No. of resources per task	Schedule units	Max. calendar length
<i>SuperProject</i> , Version 1.10 Computer Associates Micro Products Div.	\$395	No	256K	256K	No/No	Yes	1,800	180	5	Hour/day/week/month	170 years
<i>Harvard Total Project Manager</i> , Version 1.0B Software Publishing Corp.	\$495	Yes	384K	Up to 480K	No/Yes	No	Approx. 200	100	100	Minute/hour/day/week/month/year	Approx. 50 years
<i>Timeline</i> , Version 2.0 Breakthrough Software Corp.	\$495	No	256K	384K	No/No	Yes	800	Unlimited	12	Minute/hour/day/week/month	20 years
<i>Project Manager Workbench</i> , Version 2.10 Applied Business Technology Corp.	\$1,150	No	384K	512K	No/No	Yes	540 in memory, unlimited without spillover to virtual memory on disk	200	6	Hour/day/week/month	Unlimited
<i>Project Scheduler Network</i> , Version 1.1 Sector Corp.	\$495	Yes	320K	Varies	No/No	Yes	2,000	99	500	Hundredth of a day/day/week/month	10,000 time periods
<i>Microsoft Project</i> , Version 1.02 Microsoft Corp.	\$250	Yes	128K	128K	No/No	No	128	64	8	Day/week/month	Unlimited

# AT LAST, EASY, PRACTICAL GRAPHICS WITH OR WITHOUT A GRAPHICS BOARD



## INTRODUCING **MONOGRAFX™** ONLY \$69.95

■ Makes it easy and inexpensive to create organizational diagrams, Gantt charts, everyday business forms and other free-form line and block drawings on your IBM PC.

■ Lets you quickly dress up any report or overhead presentation with impressive text charts, numerical tables, bar graphs, etc.

■ Uses three different character sizes (in normal or condensed print) on sheets as large as 11" x 14".

■ Integrates graphics and text.

■ Supports most popular printers and nearly all monochrome/color graphics display adapters.

■ Is truly simple to learn and use.

### TRY IT RISK-FREE!

Send \$69.95 — or \$99.95 for an unprotected version — plus \$3 shipping (\$10 outside U.S. and Canada) to the address below. (Mass. residents, add 5% sales tax.)

MasterCard and VISA orders, CALL  
**TOLL-FREE 1-800-992-0085.** (In Massachusetts, dial 617 461-0400.)

We'll rush you your MonoGrafx software package right away. If you're not completely satisfied, just return it within 15 days of delivery for a full, unquestioned refund or credit. Our guarantee is that pure and simple.

- YES**, please rush me MonoGrafx (version 2.1) to try risk-free for 15 days. My check, money order or company PO is enclosed.
- I'm interested. But first, I'd like to review your demo disk and print samples. Enclosed is \$5 for a complete Evaluation Kit.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone ( ) \_\_\_\_\_ Ext. \_\_\_\_\_

IBM PC is a registered trademark of International Business Machines Corporation.

**Analytics International, Inc.**  
1365 Massachusetts Avenue  
Arlington, MA 02174

CIRCLE 462 ON READER SERVICE CARD

overlap or a lag. In other words, you may define a task as starting 2 days before the completion of its dependent task, and another that must wait for a day after its dependent is complete. You may schedule tasks either ASAP (as soon as possible) if you know the start date and want the earliest possible finish or ALAP (as late as pos-

date when you sign on and then runs through your project asking whether tasks scheduled for completion are in fact finished and whether tasks that should be started have been started. This makes updating your schedule considerably faster.

There is much more to like about *Timeline*. The reports may be "filtered" for different factors, so you have near total control over the contents. (You can even embed page break instructions in the notes fields.) All reports are time and date stamped to limit confusion. There is an "undo" command that lets you play "what if" with your project as much as you'd like. There are easy export facilities for spreadsheets and dBASE (full system data and not just the Gantt chart data), two tutorial levels, and, perhaps, the best manual of the group in terms of clarity and content.

*Timeline* is not flashy in its presentation, but for a serious and useful tool for planning and managing complex tasks, it is tough to do better at any price.

### APPLIED BUSINESS TECHNOLOGY'S PROJECT MANAGER WORKBENCH

Here is a product that costs more than four-and-a-half times as much as the least expensive program we reviewed. With that large a price spread, one should expect significant differences. Applied Business Technology's *Project Manager Workbench (PMW)*, Version 2.10 (the advanced version), does add some features, but the big question is whether or not the cost/performance ratio can justify the price.

*PMW* is a polished program that is designed to be easy to learn and easy to use. It relies on 1-2-3-like menus across the top of

## PC EDITOR'S CHOICE

*Although you won't go too far wrong with any of these programs—all will get the job done to varying degrees—the product of choice is Timeline. It gives you automatic network diagrams, resource leveling, easy data entry, and total control over your report contents. Add to this the ease of playing "what if," archiving of earlier versions, and complete data export functions. It provides a full complement of features without cluttering up the system with frills, and the result is a reasonably priced package that is hard to outgrow and is easy to handle. The fact that it is one of the two programs here that are not copy protected is just icing on the cake.*

sible) if you have a target date that must be hit and you want to see what you must do to be certain of making it.

*Timeline* works out the critical path and resource requirements and flags those that are overextended. If you have two resources with similar abilities, you can use the split-screen histogram display to see if you can reassigned part of the overload. If you want *Timeline* to resolve the conflict, it will quickly perform a resource leveling by adjusting the schedule, but the display will indicate which tasks have been delayed for want of adequate resources.

This program is a planning and management tool, and you can track actual performance as you go. There is even a feature that automatically archives up to five prior versions of your schedule, so that you can recover earlier drafts. The management feature that is of most help is the "alarm clock." This takes into account the



## FACT FILE



**Timeline, Version 2.0**  
Breakthrough Software Corp.  
505 San Marin Dr.  
Novato, CA 94947  
(415) 898-1919  
List Price: \$495  
Requires: 256K RAM,  
DOS 2.0 or later.

CIRCLE 461 ON READER SERVICE CARD

## ■ PROJECT MANAGEMENT SOFTWARE

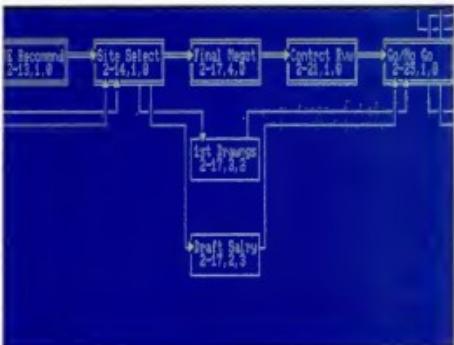


Project Manager Workbench uses an unusual way to define task inter-dependencies, resulting in a display that clearly shows the relationships.

the display, making it quick to move to any portion of the program. Should you tire of menus, however, there is an "expert mode" hidden within the program, just waiting for the right function key and Ctrl combinations to speed you directly from screen to screen. We found the menu approach to be so fast that we were never even tempted by the expert mode, but if you are a power user, this program is ready to keep up.

While most programs have a Gantt chart display and a network display, PMW adds a third. You define tasks on the Gantt display, then go to a "dependencies screen" to link the tasks. This is done with

Note: A more powerful version of the program will be released in March.



This attractive PMW diagram is made even more impressive by the fact that it was generated by the computer, not the operator.

graphics; you point to the predecessor and the successor, and PMW draws a line connecting the two. It also calculates the critical path as it goes. The result is a visual chart that maps the critical path and other tasks independent of their durations. The project network can then be generated automatically, and you do not have to bother with each task box's placement on the screen. With very complex projects, the display may not be the easiest to read, but it is far better than one created manually by someone without the skill or patience to optimize the network design.

PMW has other attractive features. It prints sideways on many printers, including Epson, for its network displays. Reports may be sent to printer, screen, or disk. Each report may be further defined through the use of various options so that you can limit the data included in the report. There are comprehensive options for unloading data in DIF or fixed-length record formats. There is even a text editor built-in so that you can create memos and letters from within PMW; it is truly designed to be the project manager's desktop tool.

The program has a few flaws, however. While it is easy to copy tasks within a project, the dependencies do not get stored. Thus in a case like our sample problem, you must redefine the dependencies for the second project even though the requirements are identical to the first. This can be

solved by storing the original project and then inserting it from the disk as a separate project because this procedure does maintain the dependencies.

The tutorial on-disk is simply an "electronic slideshow"; you sit back and watch it go by. The manual also contains an extensive set of lessons that you can work through, which expose you to most of the program features. The program is copy protected, with no way to install it on a hard disk. You are limited to 45 time periods for the Gantt chart display, but you can schedule projects that last longer than that. You have to adjust the "window" on the schedule by changing the date of the first period displayed, but this can be a bit confusing and is not well explained in the manual.

PMW is a strong package that makes strong visual presentations of its data, both on-screen or on paper. It is fast and fairly intuitive to work with, but the bottom line is whether or not its power warrants the additional cost. Most people may well find that one of the less expensive programs will serve just as well.

Alfred Poor and Bruce Brown are consultants with Soft Industries, an independent microcomputer consulting firm in Southington, Connecticut. Bruce Brown is the founder of the Connecticut Computer Society, and has written computer columns for national publications.

**PC MAGAZINE** FACT FILE

**Project Manager Workbench, Version 2.10**  
Applied Business Technology Corp.  
365 Broadway  
New York, NY 10013  
(212) 219-8945  
List Price: \$1,150  
Requires: 384K RAM, DOS 2.0 or later.  
CIRCLE 650 ON READER SERVICE CARD



*Leaders have always recognized good advice...*

## Bring your company's presentation graphics into the computer age with the best recommendation you can make: Hewlett-Packard.



**H**ewlett-Packard's Graphics Plotters introduce professional-quality graphs and charts to the office... quality that, quite frankly, makes the competition look stone-age by comparison.

Combine our brilliant color capability, precise line quality, and proven reliability—and HP becomes the obvious choice for your presentation graphics needs. When it comes to plotters, it's easy to see why HP has become the world's Number One recommendation.

### Compare the quality of an HP Plotter...

Before making your graphics plotter recommendation, find out how HP stacks up against the competition. Here's a quick checklist:

Are the lines sharp and bold? Do they meet precisely? Are the diagonal lines smooth? Is the text easy to read?

In a chart, is the area fill uniform? With HP? The answer is always yes, yes, and...yes.

### Runs with leading PCs and software packages.

HP Graphics Plotters are compatible with most of the personal computers in your office, including IBM, Compaq, and AT&T—as well as a host of HP<sup>®</sup> computers. You even have a choice of many off-the-shelf software packages, such as Lotus 1-2-3<sup>™</sup> and Symphony<sup>™</sup>—that give you "first-day" productivity.

Send today for your  
FREE sample plots—  
and see exactly what we mean.

Return the coupon—or call us toll-free at (800) FOR-HPPC. We'll send you a detailed brochure, a list of available software, plus sample plots from both an HP Graphics Plotter and a leading printer. Don't resort to stone-age methods before seeing the difference an HP Graphics Plotter can make. Call Hewlett-Packard today.

\*1-2-3 and Symphony are trademarks of Lotus Development Corporation.

*Leadership in Business Graphics.  
For Leaders in Business.*

**hp** **HEWLETT  
PACKARD**  
CIRCLE 154 ON READER SERVICE CARD



DRI502

**YES**, I'd like to make the most informed business graphics recommendation I can. Please send me your detailed brochure, plus sample plots so I can see exactly what my company's presentations have been missing. I understand I will receive this information without cost or obligation.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Mail to: Hewlett-Packard, 16399 W. Bernardo Dr.  
San Diego, CA 92127-1899.  
Attn: Marketing Communications.

11502 PMI

# Buy a Board.



# Get a Bundle.

SixPakPlus® And Advantage!™ Now With DESQview™ Multitasking/Windowing Software.

The best selling multifunction boards for the IBM® PC, PC-XT and PC-AT just got better. Now when you buy a SixPakPlus or Advantage! board from AST you'll get a free copy of Quarterdeck Office Systems' DESQview multitasking/windowing software.

You'll also get a free copy of Borland's SideKick™ desktop management software, InfoWorld's 1984 Software of the Year. And, of course, each board comes with AST's own SuperPak™ utility software, complete with SuperDrive™ RAM disk simulator — judged by PC WORLD readers as a World Class Winner for two consecutive years — and SuperSpool™ for print spooling.

That's a real bundle—the memory and I/O power you need together with three great software packages.

#### Number One In Quality.

Quality and reliability go hand-in-hand with value. Named the Number One multifunction board in PC WORLD's 1984 and 1985 World Class User Surveys, SixPakPlus offers your IBM PC, PC-XT or compatible up to 384K of RAM, serial and parallel ports, a battery-backed, quartz clock/calendar and an optional game adapter.

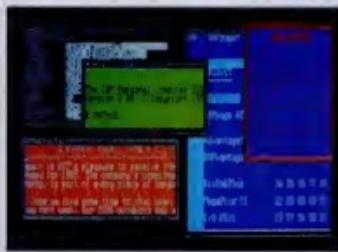
Advantage! gives your PC-AT or compatible up to a full 3 megabytes of RAM, two serial ports, a parallel port and game adapter. In PC DOS environments, Advantage!'s Split Memory Addressing™ rounds out your AT's basic memory to 640K and then supplies extended memory for SuperPak RAM disks.

#### Multitasking Power.

A powerful multitasking and windowing program, DESQview uses the increased memory of your SixPakPlus or

Advantage! to run multiple programs concurrently. And its flexible windowing capability lets you display these applications on the screen simultaneously and allows easy switching between them.

The result is that DESQview enhances productivity by allowing your PC to perform multiple tasks at the same



time. For example, you can search your dBASE II® file in background mode while you write a report with WordStar™ in the foreground — all while printing out a graph of last month's sales.

Buy an AST SixPakPlus or Advantage! board today and get a bundle. To learn more about AST quality, reliability and value contact your nearest Authorized AST Dealer or call our Customer Information Center at (714) 863-1333. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714. TWX: 753699 ASTR UR.

#### Features

##### SixPakPlus

- Memory Expansion to 384K
- Serial and Parallel Ports
- Includes DESQview, SideKick and SuperPak Software Packages
- Optional Game Adapter
- Standard Two-Year Warranty

##### Advantage!

- Memory Expansion to 3.0 Megabytes
- Two Serial Ports (One Standard; One Optional)
- Parallel Port
- Includes DESQview, SideKick and SuperPak Software Packages
- Includes Split Memory Addressing For Filling 640K Memory
- Standard Two-Year Warranty

SixPakPlus registered trademark and Advantage!, SuperPak, SuperDrive, SuperCard and Split Memory Addressing are trademarks of AST Research, Inc. DESQview trademark of Quarterdeck Office Systems. IBM registered trademark of International Business Machines Corporation. dBASE II trademark of Ashton-Tate. WordStar trademark of MicroPro International Corporation. Copyright © AST Research, Inc. 1985. All Rights Reserved.

**AST**  
RESEARCH INC.



# DATA INDEPENDENCE MUCH SMALL



The "Age of Data Independence" dawned about two years ago when IOMEGA introduced a revolutionary mass storage device called The Bernoulli Box®. Featuring a unique technology that uses rugged, removable 10-megabyte cartridges, it freed companies to work more productively and economically—and was soon recognized as the decade's biggest step forward in business data storage.

Today, IOMEGA has taken another giant step. With the addition of the compact 20-megabyte-per-cartridge Bernoulli Boxes, in single- and dual-drive versions, the Data Independence family gets simultaneously bigger and smaller. The new Bernoulli Boxes double on-line capacity to up to 40 megabytes and cut the space required to carry and store data cartridges. They also boast a footprint that is literally half that of the previous version, freeing just that much more valuable desk space. But what makes the new Bernoulli Box so exciting are the same features that made it the new standard in data management to begin with.



## TRANSPORTABILITY.

The Bernoulli Box cartridges are completely interchangeable. You're free to take the cartridge from one and use it in another with complete confidence. Take it across the hall or mail it across the continent.



## EXPANDABILITY.

Free yourself from the limitations of system capacity. If you need more, you expand by buying slim, inexpensive cartridges, not bulky and costly hardware.



## RELIABILITY.

Incredible resistance to shock and vibration combined with a rugged cartridge format frees you from concerns about equipment failure, head crash, or data loss.

THE  
**BERNOU**  
LLI BOX

# TM : MORE GIANT STEPS. ER FOOTPRINTS.



## PERFORMANCE

The amazing speed of The Bernoulli Box—with access times and transfer rates that rival and often surpass the best hard disk drives—translates into the best freedom of all: the freedom of time. And now The Bernoulli Box offers users the option of booting from The Bernoulli Box cartridge with any of the IBM PC or compatible computers.



## SECURITY

Free your sensitive files, such as payroll and personnel, from unauthorized scrutiny and free yourself from unnecessary anxiety. Put them on a Bernoulli Box cartridge, and put the cartridge where you know it will be safe.



Check out the latest Bernoulli Box family members today. More giant steps towards the complete data independence of businesses using the IBM PC, XT, AT, most compatibles, and the Macintosh®. Giant steps with very small footprints.

For the dealer nearest you, call 1-800-556-1234, ext. 215. In California, call 1-800-441-2345, ext. 215.



\*The Bernoulli Box for Macintosh is available in a 5-megabyte single-drive version and a 20-megabyte dual-drive version for AppleTalk.™

The Bernoulli Box is a registered trademark of IOMEGA Corporation. Data Independence is a trademark of IOMEGA Corporation. Macintosh is a trademark licensed to Apple Computer, Inc. AppleTalk is a trademark of Apple Computer, Inc.

HE

# BERNOULLI

DX®

**IOMEA**<sup>®</sup>  
IOMEGA Corporation  
1821 West 4900 South  
Roy, Utah 84067

Save \$150 to \$200 over Crosstalk Mk 4™ or Microsoft® Access™

# Introducing *BackComm*, the most powerful, easy to use background communication software, for only \$95

*BackComm* has a built-in command language (like dBase III®) for building communication programs. It can store over 34 million names and phone numbers that it can call automatically 24 hours a day. It squeezes, encrypts, or copies files—all from within *BackComm*. And, like Borland's SideKick®, it remains resident in background so it's always ready to communicate when you are.

*BackComm* is designed for communication for both the beginning or the most advanced user. The new user can get anywhere simply by selecting menus, while the advanced user can invoke any function with a single command.

**Works in Background**  
LaSalle Micro's *BackComm*™ background communication program remains resident in your computer's RAM memory. That means that while you are working on other programs, your computer can send or receive files. What's even more convenient, any time you want to use *BackComm*, simply press the "Alt-Break" key and you are ready to communicate in the active mode.

#### Calls Automatically

If you're a busy executive, but you need to send or receive calls, you can use *BackComm*'s automatic call menu. *BackComm*, for example, can call Dow Jones News/Retrieval, log on, get the stock information you're looking for, and log off, all automatically. Furthermore, *BackComm* can do it once a day, once an hour, or every 5 minutes—whenever you want.

If that's not enough, *BackComm*'s powerful command language can give you a warning when your stock goes above or below a certain value. And it will do all this while you're working on Lotus® 123™ or virtually any other program.

#### Powerful Command Language

*BackComm* has a built-in command language called *BackTalk*™ that does for communications what dBase III's built-in language does for databases. The flexibility is unlimited. You can write templates that convert *BackComm* into an electronic mail program, or you can go all out and write a complete com-

Screen color customization capability lets you set the color combinations you want.

Copy, encrypt, squeeze, rename, delete, and view files without disconnecting.

Each screen holds 57 names 6 screens deep.

Built-in communication language lets you automate all your communications functions.

Display date, time, time on line, cost of call, or other prompts at bottom of screen.

*BackComm* is menu-driven and command-driven.



CIRCLE 256 ON READER SERVICE CARD



munication program with *BackTalk*.

Companies can design *BackComm* to fit their specific communication needs with this powerful built-in communication language. And so can VADS and VARs. *BackTalk* will let you simplify the most complex communication procedure—whether it's downloading from a mainframe or sending a Telex.

#### Error-Free Protocol

*BackComm* uses the universal standard XMODEM protocol, but it doesn't stop there. We have added the powerful and emerging new standard—X.PC. This new protocol allows you virtually error-free transmission or reception with other software using X.PC, as well as other *BackComm* users.

But X.PC offers more. Its most powerful feature is its ability to let you have multiple communication sessions. That means you can talk to two different stock exchanges at the same time—buying on one and

selling on the other. Imagine—electronic arbitrage! In fact, you can even have up to 8 separate sessions.

#### Endless Features

There's not enough room to tell you all the features *BackComm* offers. You can store over 34 million names (DOS permitting) in a tree structured format. You can find any name, phone number, or address with *BackComm*'s built-in search command. You can keep track of the cost of every call on your screen and keep a log of all outgoing and incoming calls. And, without leaving *BackComm*, you can squeeze or unsqueeze files for lower cost transfer or even encrypt them for security.



#### Lowest Cost, Best Value

*BackComm* has all of the features you'd expect in a \$250 to \$300 program, plus more. But we think that's too much to charge. So we decided to drop the price and go for volume. You can pay more for Crosstalk or Microsoft Access, but you won't get more.

*BackComm* is not copy protected for a simple reason—we are continuously adding to and improving the program. We'll be adding specialized electronic mail templates for MCI Mail, Easy Link™ and other programs—all at a low price. (All of these additions will be built from our built-in language *BackTalk*.) For these additions, as well as the basic program enhancements, we believe everyone will want a registered version to keep up to date.

Order your copy now. Simply call 1-800-882-5171 Ext. 200



and give us your VISA, MasterCard, American Express, or Diner's Club number. We'll send you your copy of *BackComm* immediately.

# LASALLE MICRO™

1350 Remington Rd, Suite W  
Schaumburg, IL 60195

In Illinois, call 1-312-882-5171

#### Dealer Inquiries Invited

BackComm, BackTalk, and LaSalle Micro are trademarks of LaSalle Micro, Inc. Crosstalk and Crosstalk Mk 4 are trademarks of Crosstalk, Inc. X.PC is a trademark of Ashton Tate. Microsoft, MCI Mail, Easy Link, and Microsoft Mail are registered trademarks of Microsoft Corporation. Sidekick is a registered trademark of Borland International, Inc. Lotus is a registered trademark of Lotus Development Corp. IBM is a registered trademark of the International Business Machines Corporation. DOS is a service mark of Microsoft Corp. Dow Jones News/Retrieval is a registered service mark of Dow Jones & Company, Inc. Lotus 1-2-3 is a trademark of Lotus Development Corp. 123 is a registered trademark of Intertech Corp. Lotus 1-2-3 is a registered trademark of the International Business Machines Corporation. IBM is a service mark of Western Union Corp. Dow Jones News/Retrieval is a registered service mark of Dow Jones & Company, Inc. MS-DOS is a registered trademark of Microsoft Corp. PC, XT, AT or IBM compatible and DOS 2.1 or higher are trademarks of IBM Corp. © LaSalle Micro, Inc. 1985

# RCA ENTERS THE E-MAIL FRAY

*RCA Mail for PCs offers a wide range of easy-to-use features and a familiar interface, but its lack of a large user base and a cheap hard copy option may hamper it.*

**W**hile electronic mail (popularly known as e-mail) is deservedly called the business communications tool of the eighties, new entries into the market face a long uphill battle. They must compete against established systems that already have large customer bases on which to draw. These services may be succeeding because of a long history in the communications field (such as Western Union's EasyLink) or because of user accessibility and a wide range of services (such as MCI Mail). Any company planning to compete as a public-access e-mail system must therefore be able to offer enough to customers to draw in a substantial user base—after all, an e-mail system is really useless unless those who use it have somebody to send their mail to.

## ■ RCA E-MAIL

### BECOME TO RCM MAIL!

RCA MAIL is a service mark of RCA Global Communications, Inc.

Your last access was Monday, Nov 18, 1985 2:05 PM EST  
Your access today is Monday, Nov 18, 1985 2:15 PM EST

No.	Delivered	From	Subject	Lines
1	Nov 15	9:00	TEST.RCA	First test message

Command? read

Posted: Thu Nov 14, 1985 10:41 AM EST      Msg: AGIF-2309-0014

From: JDST.RCA  
To: Test.rca  
Subj: First test message

This is a false message. I am sending this message in order to test out RCA's new E-mail system. I will first convert this message into ASCII and then try to send it to myself. Let's see what strange editorial changes happen then.

Action?

Esc for Attention None to Switch | Capture VII | On 00:01:33

*RCA Mail for PCs' opening menu lets you know if there are any new messages to be read on the bulletin board.*

RCA Global Communications has thrown its hat into the ring with its new service called RCA Mail for PCs. While the main emphasis of the system is on easy accessibility to telex services, the system now also offers e-mail services, a bulletin board, and an informational database called Hotline.

RCA Mail for PCs is actually only part of that corporation's e-mail system. RCA Mail is an intracompany e-mail system marketed by RCA. By buying access to RCA Mail, large corporations can acquire an on-line network that distributes files, memos, bulletins, and other messages. Each company's system is administered by a single corporate representative who takes people on and off the system, decides on each user's level of access, and watches over the company's on-line bulletin board messages.

However, to accommodate individuals and smaller companies, RCA recently introduced RCA Mail for PCs. According to an RCA representative, RCA Mail for PCs is an exact replica of its corporate cousin, except for two differences: the on-line bulletin board is an RCA-managed, read-only system and the full system is administered by RCA itself rather than a user representative. RCA Mail for PCs was scheduled to

officially come on-line on January 1, 1986; at the time of this writing, it was still officially at the beta-test stage. However, since the system on which it was running is the same as that of the already established corporate e-mail system, it worked for all intents and purposes like a finished product.

**AN MCI-LIKE STRUCTURE** At first glance, RCA seems to have taken a leaf out of MCI's book for its format and commands. RCA Mail, which runs out of the Telenet network, is accessed with an officially registered name and password. You operate the system by responding to a "Command?" prompt with such one-word commands as SCAN, READ, FORWARD, ANSWER, PURGE, COMPOSE, and CHECK. Using these commands in combination with various formulas, you can receive and send e-mail, create letters and save them to a file, and access the bulletin board system.

Many times, your first introduction to an on-line system determines whether that system will be only a test case or become a habit. RCA has done a great deal to welcome new users to its system. It's a great timesaver when you can immediately make full use of a communications system's fa-

cilities without having to puzzle over a list of unfamiliar commands. RCA's documentation features two well-organized pamphlets, a *Basic User Guide* that explains how to sign on, create and read mail, and deal with the filing and bulletin board system and an *Advanced User and Editing Guide*. The latter title is slightly misleading, by "advanced user," RCA seems to mean anyone who has used its service more than once. The manual details commands such as SCAN, READ, UNREAD, and DISPLAY OPTIONS and explains all the text-editing features.

The documentation that accompanies RCA's Hotline service isn't nearly as usable. The pamphlet I received was little more than a promotional brochure; the company representative later sent me an "outdated" leaflet that was much more informative.

RCA Mail also includes a brief, but very well executed, on-line tutorial that



## F A C T F I L E

**RCA Mail for PCs**  
RCA Global Communications  
60 Broad St.  
New York, NY 10004  
(800) 526-3969 (operator 7)

### Basic E-Mail Charges

- If using local access, business rate (7 a.m. to 6 p.m., weekdays) is \$14 per hour; off-peak rate (6 p.m. to 9 p.m. weekdays and 7 a.m. to 9 p.m. weekends and holidays) is \$7 per hour; night rate (9 p.m. to 7 a.m. daily) is \$4 per hour.

- If using WATS access, business rate is \$18 per hour; off-peak rate is \$14 per hour. Night rate is \$6 per hour.

- For international calls, \$14 per hour plus international access charge.

### Other E-Mail Charges

- Character transmission charge, \$.05 per unit (a unit consists of 1,000 characters transmitted in and out of the system per session).
- Broadcast delivery charge (for messages sent to more than one person), \$.05 per additional addressee.

- Storage charge (for data stored for more than 5 days), \$.007 per day per unit.

### Hotline

- \$.80 per minute for 300 baud
- \$.90 per minute for 1200 baud

CIRCLE 648 ON READER SERVICE CARD

SAVE OVER 30% ON OUR GIFT PACKS!  
60-DAY MONEY-BACK GUARANTEE

# How Borland's Three New Holiday Packs Will Fill Your Stocking Without Emptying Your Piggybank.

Three special packs with dazzling discounts that will get you into a Holiday mood. You can get some of Turbo, most of Turbo, or all of Turbo—including the two newest members of the Turbo family, Turbo GameWorks™ and Turbo Editor Toolbox.™ You also get our unmatched 60-day money-back guarantee, quality products that aren't copy-protected.

## TURBO NEW PACK \$95.00.

You get the two exciting new members of the Turbo Pascal family.

- TURBO GAMEWORKS, Chess, Bridge, and Go-Moku, complete with source code and a 200-page manual.
- TURBO EDITOR TOOLBOX, all the building blocks to make your own editor and word processor, complete with source code and a 200-page manual.

## TURBO HOLIDAY PACK \$125.00.

You get all three of the Turbo family classics for only \$125.00 (about a 30% discount), Turbo Pascal 3.0 and Turbo Tutor and Turbo Database Toolbox—all for just \$125.00.

- TURBO PASCAL combines the fastest Pascal compiler with an integrated development environment.
- TURBO TUTOR teaches you step-by-step how to use Turbo Pascal with commented source code for all program examples on diskette.
- TURBO DATABASE TOOLBOX offers three problem-solving modules for your Turbo Pascal programs. Turbo Access, Turbo Sort, and GRNST, which generates a ready-to-run installation program that lets you forget about adapting your software to specific terminals.

## TURBO HOLIDAY JUMBO PACK \$245.00.

This is it—the whole thing, the entire Turbo family including its two newest members. You get

- Turbo Pascal
- Turbo Tutor
- Turbo GameWorks
- Turbo Editor Toolbox

and you pay only \$245.00 for all six! Which means that you're getting everything at about only \$40 a piece. Quite a holiday deal. (And if you already own one or several members of the Turbo family, be creative—nothing can stop you from buying the Jumbo Pack, picking out the ones you already have and giving the rest as holiday gifts to family and friends. At these prices you can afford to give to others and to yourself.) Speaking of Holidays, this offer lasts until March 31, 1986. (At Borland, we like to make the Holidays last.)



BORLAND  
INTERNATIONAL

4545 SCOTT'S VALLEY DRIVE, SCOTT'S VALLEY,

CA 95066 PHONE: (408) 438-8400 TELEX: 112073

Copyright 1985 Borland International Inc. 1017B

Turbo Pascal and Turbo Tutor are registered trademarks and Turbo Database Toolbox, Turbo Graphics Toolbox, Turbo Editor Toolbox, Turbo GameWorks, and Turbo are trademarks of Borland International Inc. Turbo is a trademark of MicroPro International Corp. MultiMate is a trademark of Multisystem International Corp. Microsoft is a registered trademark and Word is a trademark of Microsoft Corp. WordPerfect is a trademark of Software International.

CIRCLE 150 ON READER SERVICE CARD

NEW!

## TURBO GAMEWORKS

\$69.95.

Our new Turbo GameWorks offers games you can play and replay without Turbo Pascal or revise and rewrite with Turbo Pascal 3.0. We give you the source code, the manual, the diskettes and the competitive edge. Chess, Bridge and Go-Moku. State-of-the-art games that let you be player, referee, and rules committee all at once because you have the Turbo Pascal source code. Learn exactly how the games are made—so you can go off and make your own. And Turbo GameWorks is the only quality game you can buy that is not copy-protected. Sold separately, only \$69.95. (Our \$47.50 if you buy the Turbo New Pack.)

NEW!

## TURBO EDITOR TOOLBOX

\$69.95.

Build your own word processor—for only \$69.95!

You get ready-to-source code, a full-featured WordStar™-like word processor, and a 200-page manual that tells you how to integrate the editor procedures and functions into your programs. With Turbo Editor Toolbox, you can have the best of all word processors. You can make WordStar behave like Multi-Mate. Support windows just like Microsoft's Word. And do it as fast as WordPerfect does. Incorporate your new "hybrids" into your programs to achieve incredible control and power. Sold separately, only \$69.95. (If you buy the Turbo New Pack, the price drops to just \$47.50.)



## Holiday Gift Packs, Turbo GameWorks™ & Turbo Editor Toolbox™

NOT COPY-PROTECTED

Available at better dealers nationwide. Call (800) 536-2283 for the dealer nearest you. To order by  
Credit Card call (800) 255-8008, CA (800) 742-1133

More checks payable to  
Borland International Inc.  
The holiday packs include an upgrade  
coupon for both options and get BCD  
and 8037 support for \$35.95 (regularly  
\$55.00).

Carefully describe your computer system  
Mine is... 8-bit — 16-bit  
I use... PC DOS — MS-DOS  
— CPM 80 — CP/M 86  
My computer's name and model is:

The data size I use is: □ 3½" □ 5¼" □ 8"

Name \_\_\_\_\_

Shipping Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_

Sales \_\_\_\_\_

Telephone \_\_\_\_\_

NOTE: Turbo Editor Toolbox and Turbo GameWorks  
are available for the PC, PC/XT and PC-compatibles  
using Turbo Pascal 3.0/CPL 1.0.

CCD & Purchaser Orders will not be accepted by Borland International  
California residents add 6% sales tax. California U.S.A. add \$10.00 and  
international add \$15.00. Payment by check/cash payable in U.S. dollars drawn on a U.S. bank.



Quantity
*Turbo Holiday Jumbo Pack \$245.00
*Turbo New Pack \$69.95
Pascal \$69.95
Pascal whole? \$109.95
Pascal whole? + BCD \$139.95
Turbo Database \$144.95
Turbo Graphics \$144.95
Turbo Tutor \$89.95
Turbo Editor \$89.95
Turbo GameWorks \$89.95

These prices exclude shipping to all U.S. states. All foreign orders add \$10 per package.

Amount (CA and 6% tax)

Payment: VISA MC Check Bank Draft

Credit Card Expiration Date \_\_\_\_\_

Card # \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Comments \_\_\_\_\_

## ■ RCA E-MAIL

can be accessed by typing COMPOSE TRAINER at the command prompt. The tutorial covers the material in the *Basic User Guide*; on-line help for more-advanced features is available by typing a question mark and the problematic command at the prompt. This entry produces a short explanatory note and an offer for more help if needed.

**SIGNING ON** Once you have entered RCA Mail for PCs, you immediately receive notice of any messages or incoming telexes that have arrived since you last signed on. You can then read these messages either one by one or by entering their individual numbers. You can also request messages sent to you either by specific people or on, before, or after specific dates. The program will either halt between messages or scroll straight through. You can stop the scrolling at any time by pressing Ctrl-S. Once you've read your messages, you can automatically answer them, discard them using the PURGE command, or save them under your own filename for future reference. However, you must dispose of them (and any unsent drafts) in some manner before signing off or the program will inform you that you still have unfinished business in your "workspace." You cannot sign off until you have accounted for everything.

The COMPOSE command by itself initiates a new message. It works very much like MCI Mail's CREATE command; you are immediately queried by the program for the recipient by a "To:" prompt, followed by "CC:" and "Subject:" requests. You can then enter the text of the message, either on-line or by downloading a previously saved ASCII text file.

You indicate the end of your message by typing a period in the beginning of a line. The program then asks if you want to send the message. If you want to send a "plain-vanilla" message, with no special options, you then simply type YES and it is immediately posted (the program gives you a confirmation).

RCA Mail for PCs offers a range of special options that can also be used at this point. By typing NO at the "SEND?" query and waiting for the command prompt, you can attach various useful criteria to your message, some of which are

WELCOME TO RCA MAIL!  
RCA MAIL is a service mark of RCA Global Communications, Inc.

Your last access was Thursday, Nov 21, 1985 3:48 PM EST  
Your access today is Thursday, Nov 21, 1985 3:52 PM EST

CHECK these bulletin boards:  
RCA.MAIL

No new mail.

Command? scan

No new mail.

Command? scan unfiled

No.	Delivered	From	Subject	Lines
1	Nov 18 14:32	ADMIN	RE: CREATE new list named PCLIST	7
2	Nov 21 14:05	A.GARRETT	demo of service	3
3	Nov 21 14:14	RCA.TELEXTRA	RCA THRU DATA MSG 7296 TO 256042	12

Command?  
ESC FOR Retention Home to Switch | Capture File | On Off |

By using RCA Mail for PCs SCAN UNFILED command, users can call up an opening screen that was previously displayed, as long as the messages were neither saved to an on-line "file" nor deleted in a previous session.

new to me. For example, you can classify a message as private so that the recipient must enter a personal ID number to read it; you can tag it for a receipt (so that you receive acknowledgement that it's been read) or as a registered message (the recipient must acknowledge the message before it can be read); finally, you can flag it as urgent and send it to the top of the recipient's list of messages. I found it interesting that RCA Mail allows you to send messages on or after a certain date or post them repeatedly for a specified time period (a feature that could certainly help executives remind their employees of deadlines). Finally, if you have sent a hastily composed message and decide that you shouldn't have sent it, you can use a CANCEL command to destroy it (providing that it hasn't already been read).

**QUICK AND EASY EDIT** In a previous review of electronic mail systems, I asserted that the one thing that all these systems had in common were unusable text editors. (See "In Touch with the Outside World," PC Magazine, Volume 4 Number 18.) While RCA Mail's editing system is certainly not up to word processor standards, it is head and shoulders above anything

else out there at the present time.

First of all, it does not force you to enter a separate edit mode to revise a typed message. Since RCA Mail uses a period to indicate a command during the creation or revision of a message, you can either type the period to end the message or immediately enter an editing command. For example, by typing .LIST you can generate a numbered line-by-line copy of your message. At that point, you can use other commands to delete or insert lines, continue the message, or renumber the message to take changes into consideration. You can also do a considerable amount of line-editing, and this function is where RCA Mail for PCs really shines.

Many commercial e-mail systems assume that you have a blow-by-blow memory of a six-page message; when you indicate that you wish to change a certain line, the program asks you for the change without showing you the line. RCA Mail uses a method similar to that of many noncommercial bulletin board systems. Once you have typed .MODIFY and the page or pages you need to edit, the program repeats the line and then gives you a blank line underneath it in which to type your changes. You can add and delete spaces,

# Borland Introduces Reflex, The Greatest Analytical Tool Since The Couch

## INTRODUCING REFLEX, THE ANALYST.

If you use Lotus 1-2-3™, dBASE® or PFS File™, you need Reflex™—because it's a totally new way to look at your data. It shows you patterns, relationships and interrelationships you didn't know were there, because they were hidden in data and numbers.

Reflex is the first database that separates the trees from the forest. The first database that understands that what you see depends on how you look at it.

The first database that probes relationships—then shows them to you in various graphic forms—scatter, line, bar, stacked bar and pie charts.

The first database to break the bonds of traditional DBMS (Data Base Management Systems) and give a dramatic visual turn to data analysis.

Reflex makes graphic leaps far beyond 1-2-3. With Reflex, when you look, you see.

## REFLEX OPENS MULTIPLE WINDOWS WITH NEW VIEWS AND GRAPHIC INSIGHTS.

You use Reflex's Form View to build your database; the List View lets you put data in tabular List form; the Graph View gives you instant interactive graphic representations; the CrossTab View gives you amazing "cross-referenced" pictures of the links and relationships hidden in your data. Report View allows you to import and export data to and from Reflex, 1-2-3, dBASE, PFS File and other applications and print out information in the formats you want. In fact, Report View is probably the best 1-2-3 report generator you can buy today. It's also the cheapest—and you're getting all the other features free.

The commands for all five Views are consistent—so you're not stuck learning five different ways to get something done. And because Reflex uses advanced windowing techniques, you can see several views on the screen at the same time—without having to switch back and forth. You get the picture—and the pictures—all at once—if that's the way you want to look at things.

Modify a number and all your Views—List, Form and Graph—are immediately updated, on-screen. Changing a number changes the picture—which is mighty handy when you're analyzing (let's say) sales figures by salesperson; or you're in "What If?" country asking yourself "What if we could add 2.5% in January sales?"

"Show me."

## HOW THE CRITICS REACT TO REFLEX

"The next generation of software has officially arrived."

Peter Norton, PC Week

"Reflex is one of the most powerful database programs on the market... its multiple views, interactive windows and graphics, graph report writer, pull-down menus and cross tabulation make this one of the best programs we have seen in a long time. The program is easy to use and not intimidating to the novice. Reflex not only handles the usual database functions such as sorting and searching, but also 'what-if' and statistical analysis. It can create interactive graphics with the graphics module. The separate report module is one of the best we've ever seen."

Marc Stere, InfoWorld

"What you see, then, is an interesting blend of a database and a spreadsheet that is ideal for analyzing whole data."

Adam R. Green, InfoWorld

More flexible than spreadsheets, this easy-to-use database analysis package presents information with visual clarity. Reflex is for you. The flexibility of switching between different views of the data lets you see relationships you may have previously overlooked. Without "what-if" analysis, key variables—such as cost of goods sold or travel expenses—may not be hand-tied unnoticed. The type of analysis to uncover such a hole is inherent in do-it-on-a-spreadsheet, yet it may mean the difference between success and failure in a competitive situation.

Ira H. Krawin, Business Computer Systems

"Give me the picture." "Show me what happens when we shift 11% of Nebraska's inventory to the new store in Hawaii."

"Show me how many Gizmo 28's we have in every store in every state as of midnight last night and what happens to our East Coast stocks if the shipping strike lasts more than a week." "Show me."

So Reflex shows you. Instant answers. Instant pictures. Instant analysis. Instant understanding.

## HOW IN THE WORLD CAN BORLAND SELL A PHENOMENAL PRODUCT LIKE REFLEX FOR ONLY \$99.95?

At \$495.00, Analytica's original price, Reflex was a bargain. Acclaimed by critics and praised by users, Reflex also got our attention at Borland International. We were so impressed by Reflex that we bought the company!

To celebrate that, we're making business software history by offering Reflex—for A LIMITED TIME—for ONLY \$99.95! (Offer good through March 31, 1986).

That's \$395.05 off the original price—which is a pretty good return on your toll-free phone call.

We think Reflex should be an "automatic product," a "standard" that every PC owner should own. That's why we priced it at \$99.95. Naturally we've added our 60-day money-back guarantee and Borland's Reflex is not copy-protected.

NOT COPY-PROTECTED

# REFLEX™ THE ANALYST™

To order by Credit Card call (800) 255-8008, CA (800) 742-1133  
Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you

YES! Rush  
Reflex to me  
Send me \_\_\_\_\_ copies.

**System requirements:**  
IBM PC, XT, AT and  
compatibles, MS-DOS 2.0 or  
higher, 320K Color Graphics  
Adapter, Hard Disk or Equivalent  
PC DOS 2.0 or greater, 1MB  
disk and mouse optional

**60-DAY  
MONEY-BACK  
GUARANTEE**

**\$99.95**

This price includes shipping to  
all U.S. cities. All foreign orders  
add \$10 per product ordered.

Name \_\_\_\_\_  
Shipping Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone \_\_\_\_\_  
Card # \_\_\_\_\_  
Subtotal \_\_\_\_\_  
(CA res. add 8% tax per card)  
Amount Enclosed \_\_\_\_\_  
Payment \_\_\_\_\_ VISA MC BankAmeric Check  
Credit Card Exp. Date \_\_\_\_\_  
Card Expiry \_\_\_\_\_

CODES AND PURCHASE ORDERS WILL NOT BE ACCEPTED BY BORLAND. California residents add 8% sales tax.  
Outside USA and FPO add 10% sales tax.  
U.S. dollars drawn on a U.S. bank.

R7

Copyright 1986 Borland International. BORLAND



**BORLAND**  
INTERNATIONAL

4185 Scotts Valley Drive, Scotts Valley CA 95066  
Phone: (408) 458-8000 Telex: 773773

Trademark. Reflex is a trademark of Borland International Inc. Lexis is a registered trademark and Lexis 2.7 is a trademark of Lexis Development Corporation. IBM is a registered trademark of IBM Corp. PFS File is a registered trademark and PFS File 2.0 is a trademark of Software Publishing Corporation. MS-DOS is a trademark and PC is a registered trademark of Microsoft Corporation. AppleTalk is a trademark of Apple Computer Inc. PC DOS is a trademark of IBM Corp. 320K Color Graphics Adapter is a trademark of Texas Instruments. Macintosh is a trademark of Apple Computer Inc. Borland International is a registered trademark of Borland Computer Technology.

CIRCLE 147 ON READER SERVICE CARD

## ■ RCA E-MAIL

editing facilities.

I'm also going to try to show the immediate editing facilities.

Barb

list

This is a sample of an RCA e-mail message. I am writing this for possible screen shots, and to show the programs editing facilities.

I'm also going to try to show the immediate editing facilities.

88 Barb

Continue:

modify 50

50 I'm also going to try to show the immediate editing  
    {<<< you >>> }

50 I'm going to try to show you the immediate edit  
    {                        } various{<<< ing

50 I'm going to try to show you the various editing

LED FOR ATTENTION Home to Switch Capture VIII 10:10 AM

*One of RCA Mail for PCs' most convenient functions is its on-line text editor. Notice that all changes are entered below the requested text by either substituting text or using easily learned symbols for deleting or inserting spaces.*

words, and phrases; the only problem is if you have two long changes that occur close to each other in the same line. In that case, you are forced to edit the line twice, making each change separately. This system strongly reminded me of editing a hard copy manuscript; the only difference in this case was that changes were made underneath the line rather than above it. Once you have entered your changes and hit Return, RCA Mail shows you the new line and gives you another chance to edit it; if you press Return again, it will proceed to the next specified line or prompt you for your next action.

**MAILING LISTS** Individuals or small companies that wish to send the same message to several addressees can produce automatic on-line mailing lists with the system. After typing COMPOSE LIST, you are given a series of prompts to help you create such a list. All addressees must be previously registered with RCA Mail for PCs; unfortunately, you cannot combine the on-line and telex message service for this purpose.

RCA uses somewhat confusing terminology that is apparently a holdover from its intracompany service. At one point, the

prompt will ask, "Who can access?"; this is not a request for your addressees, but for the members of your assumed corporation. As an individual user, you are automatically assigned the level of subdivision, the name of which you must enter here. (Your user division is considered to be RCA Mail for PCs.) Once all that is made clear, you can then individually enter the names on your list. It takes from 24 to 48 hours for the names to be verified, and all the addressees will be sent notification that they are now on your list.

Unfortunately, while RCA Mail heavily supports telex and on-line communication, it does not have any facilities for hard copy mail. This lack could be a considerable problem in a system with a limited user listing (although not for those who intend to use it as an intracorporate communications system).

The company does encourage user comment. The COMPOSE command doesn't only signal a new message; in combination with other commands it gives access to Teletex numbers and rates and sends requests for help or critiques of the service directly to RCA.

In fact, I was very impressed with the range of facilities that RCA Mail for PCs

offers. Previously read messages can be put back into your current mailbox (so that they are automatically brought up the next time you sign on), filed away for future reference, or put into a sort of limbo (called unfiled) until you decide what to do with them. If you purge a message and then suddenly realize that you made a bad mistake, you can unpurge it if you change your mind within 24 hours. Since there is a storage charge for messages kept after 5 days, you can also set a facility called AUTOPURGE, which (as the name implies) automatically deletes your messages after

■ It has become almost a prerequisite among on-line communications systems to also offer a database of some sort. RCA actually offers two: the **RCA Mail bulletin board and Hotline**.

a specified length of time. And all these commands are laid out in the documentation and on-line help in a logical, easy-to-learn fashion.

**ON-LINE INFORMATION** It has become almost a prerequisite among on-line communications systems to also offer a database of some sort. RCA actually offers two: the **RCA Mail bulletin board and Hotline**.

The bulletin board is directly accessible from RCA Mail; any new messages are announced right after you sign on. By entering CHECK, you enter the bulletin board service and from there can read any messages that RCA has posted. Unlike the intracorporate RCA Mail service, which allows verified personnel to post messages on the corporate bulletin board, the **RCA Mail for PCs bulletin board only contains messages from RCA itself concerning the**

# Borland introduces Turbo Lightning™ the fastest, most amazing information system since your brain

You can now find out everything in a flash. With instant access to electronic versions of the 83,000 word Turbo Lightning™ Random House® Speller & Word List, the 50,000-word Turbo Lightning Random House Thesaurus™ and the soon-to-be-released Turbo Lightning Encyclopedia™ — and to an astonishing array of electronic reference books which form Borland's new Turbo Lightning Library™.

Hitting one key on your IBM® personal computer — taps you into this new electronic age of instant information.

You get the right word, the right spelling, the right name, the right address, right now.

What we've done has been called "Artificial Intelligence," we simply call it "Turbo Lighting." This information revolution — driven by Turbo Lighting — means that the way you look things up is definitely looking up.

## No matter what program you're running,

**Turbo Lightning instantly checks your spelling as you type.** You could be running WordStar®, MultiMate™, Sidekick®, Microsoft® Word, MCI Mail®, CompuServe®, or whatever, because as you work, as you write, Turbo Lightning is waiting in the wings, watching how you spell every word, but not getting in the way of what you're doing.

So how does it work? Let's say the word you meant to type was "RIGHT," but you accidentally typed "RHGST," which is wrong. What happens then?

You immediately hear a "beep" so you know there was a boo-boo. You instantly see a window, that doesn't list "RHGST" but it does list "RIGHT" and its sound-alike words. So your screen looks like this:

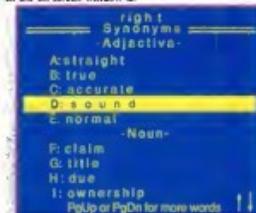


So you move your cursor to "A," which is the right "right," hit Return and the spelling mistake is instantly fixed. And the program you were working on has continued to run while you did a little spelling sidebar with Turbo Lightning. (If you'd rather not remember your spelling grades in school, the *spell right* mode lets you, but you can choose the "whole page" option, which means that when you finish writing the entire page, any spelling mistakes will be highlighted. You go in and zap those things out *right away*.)

Lightning never goes away, is 100% concurrent, reliable, accurate and concise, does not, will not *crash & burn*.

Your document, letter, report, spreadsheet is word perfect and no one ever knows that you can't spell for beans.

**Turbo Lightning does a lot more than spell "right" right, it also gives you instant synonyms.** Because you also have Turbo Lightning's Random House Thesaurus at your fingertips, you can really get to know your "rights." So back to the word "Right," but this time in the thesaurus. Type in "Right" and what you see in the on-screen window is:



So you instantly know more than one way to say, "The Boss is always right," which is handy if you get cornered and have to lie like that.

**Introduce yourself to Turbo Lightning and it will never ever forget your name.** It's conceivable, if unfair, that your name is not in the dictionary already, but you can instantly teach Turbo Lightning your name and all the other names and words it needs to know to help run your business or personal life.

Once you've taught Turbo Lightning what it needs to know, you'll never blow it with a letter to the Joint Chiefs of Staff, the *Kagyan White House* or mess something up on your IBM PC. (IBM PC is a trademark of International Business Machines Corp.)

Not \$500, not \$400, not \$300, not \$200, not \$100, just \$99.95 for this instant electronic miracle. Our success is pretty simple. We're not greedy. We believe that it is better to sell hundreds of thousands of software programs at a reasonable price—instead of a few at prices that would make Jesus James blanch.

Just \$99.95 gets you into the Turbo Lightning Library—which is an incredible deal when you look at what you're getting. You're getting the access system—Turbo Lightning—which is the "engine" that powers the whole Turbo Lightning Library. You're getting the "engine" plus the 83,000-word Turbo Lightning Random House Speller and Word List, the 50,000-word Turbo Lightning Random House Thesaurus. And you're getting all that for an incredible \$99.95!

If you ever write a word, think a word or say a word, you need Turbo Lightning. We give you a 60-day money-back guarantee and of course there's no copy protection. \$99.95 isn't much to pay for a mistake-free life. Not to mention an education. No matter who you are or what you do, you need Turbo Lightning. That \$99.95 will be the best \$99.95 you ever spent on yourself or your company.

Do yourself, your assistance, your secretary, your boss, your render, your audience and your career a favor, get Turbo Lightning today!

**NOT COPY-PROTECTED**

**TURBO**

**Lightning**

**60-DAY MONEY-BACK GUARANTEE!**

**System Requirements:**  
128K IBM PC or 100% compatible computer with 2 floppy disk drives

**Name:** \_\_\_\_\_  
**Shipping Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip:** \_\_\_\_\_  
**Telephone:** \_\_\_\_\_

**YES! Rush**  
**Turbo Lightning to me**  
**Send me \_\_\_\_\_ copies**

**\$99.95**

*This price includes shipping to all U.S. states. All foreign orders add \$10 per product ordered.*

**Subtotal:** \_\_\_\_\_  
**(CA, NY and IL add \$6 per copy)**  
**Amount Enclosed:** \_\_\_\_\_  
**Payment:**  VISA  MC  BankAmericard  Check  
**Credit Card Exp. Date:** \_\_\_\_\_/\_\_\_\_\_  
**Card #:** \_\_\_\_\_/\_\_\_\_\_  
**LT**

Available at better dealers nationwide. Call (800) 555-2283 for the dealer nearest you.

To order by Credit Card call (800) 255-8008, CA (800) 742-1133

Circle 142 on Reader Service Card

**BORLAND**  
INTERNATIONAL

4455 Scotts Valley Road, Scotts Valley, CA 95066 • Phone: (408) 458-8400 • Telex: 712073

CIRCLE 142 ON READER SERVICE CARD

© 1985 Borland International, Inc. Turbo Lightning is a trademark of Borland International, Inc. WordStar is a registered trademark of DRiM, Inc. Sidekick is a registered trademark of Ashton-Tate, Inc. Microsoft is a registered trademark of Microsoft Corporation. CompuServe is a registered trademark of CompuServe Information Services, Inc. MCI Mail is a registered trademark of MCI Communications Corporation. Turbo Lightning is a trademark of MultiMate International Corp. The Kagyan White House is a registered trademark of International Business Machines Corp. IBM PC is a trademark of International Business Machines Corp.

Copyright 1985 Borland International BI-1021

## RCA E-MAIL

service. For example, when I signed on, I found a notice announcing updates to the READ command.

Since RCA's Hotline service, like RCA Mail, is derived from a telex-based communications system, it is accessible both by microcomputer and by telex machine. Hotline offers a large variety of information categories, including business and finance, commodities, general interest (horoscopes, film reviews, and the like), graphics (such as zodiac signs and holiday greetings—according to RCA, this is one of their most popular features), stock exchange information, newswire (national and international, sports, science and medical, and weather reports), and foreign language instructions and indexes. Hotline operates through the use of specific keywords for each category; there are also "quicodes" for faster searching.

Unfortunately, however, Hotline is accessed separately at the Telenet prompt rather than directly from RCA Mail. This method can be an inconvenience for those who like to check out their mail and then drop immediately into the database. However, since you do not have to actually make another phone call, it could be worse.

All in all, RCA Mail for PCs is a well-organized, well-run electronic mail sys-

Command? compose list  
CREATE a new list, ADD members, or DELETE members: create  
Please enter the list name: tryout  
Who can access this list: subdivision

Please enter SYS, ORG, DIV, SUBDIV, SEC, or SUBSEC to indicate the body of users permitted to send to this list. Press RETURN for the default setting of ORG.

Who can access this list: subdiv  
Member: test.rca  
Member: a.garrett  
Member: g.smith  
Member: x.fiction  
Member:

Thank you! Information submitted.

There is no one registered by this name:  
g.smith

Correct, Omit, or Hold:

esc for Attention None to Switch Capture III 1m 00.00 00

*RCA Mail for PCs allows you to create a mailing list by guiding you through a series of prompts. Notice that, as an individual user, you are listed as a "subdivision." Addressees are checked for registration on RCA Mail; once you signal a completed list, the program asks you to account for discrepancies.*

tem. As in most such services, its success may be based on how many users it can lure away from such well-used systems as MCI Mail and CompuServe—especially since subscribers who want to use it to con-

tact nonsubscribers will have to use the rather-more-expensive telex system. However, if RCA can overcome that single hurdle, it could end up leading the pack. ■

### E-Mail Systems: Summary of Features

System	On-line help	Hard-copy surface mail	Other mail services	On-line message edit	Menu mode	Expert mode	Message distribution lists	Storage	Bulletin board system	Databases
EasyLink	Yes	Yes	Telex, Mailgram, Cablegram, Telegram, Express (overnight and 2-hour, courier-delivered)	No	Yes	Yes	Available through off-line arrangement	Messages held optionally for 3 days	Yes, through FYI	FYI News Service, Infact
ECHO	Yes	Yes	Overnight	Yes	Yes	Yes	Immediate on-line list creation	Messages stored indefinitely on ECHODisk	Yes	No
MCI Mail	Yes	Yes	Overnight, 4-hour courier-delivered, Telex	Yes	Yes	Yes	Immediate on-line list creation	24-hour storage w/basic service; 5 days w/advanced service	No	Dow Jones News/Retrieval
RCA Mail for PCs	Yes	No	Telex	Yes	No	Yes	On-line list creation w/ 24/48-hour verification	Messages stored indefinitely w/charges after 5 days	Yes	Hotline

New for SideKick Users!  
Includes Free Pen and Solar Calculator

# Borland introduces Traveling SideKick, it's your SideKick's™ sidekick!



## What's inside the Organizer Binder

ADDRESS BOOK SECTION  
FOR PRINTED FORMS WITH DIVIDERS AND  
TAB FOR EASY REFERENCE.

PHONE DIRECTORY SECTION  
PRE-PRINTED PHONE DIRECTORY  
COMPUTER OR MANUALLY UPDATED.

MISCELLANEOUS SECTION  
TO HOLD LETTERS, PRE-PRINTED FORMS  
AND COMMONLY USED RECORDS.

REFERENCE SECTION  
CONTAINS MAPS, TIME ZONES,  
800 TRAVEL NUMBERS, TRAVEL  
ADVICE, MONEY EXCHANGES, ETC.

FINANCE SECTION  
EXPENSE REPORTS, RECEIPT LOG AND  
STORAGE ENVELOPE, CREDIT CARD  
INFORMATION, ETC.

CALENDAR SECTION  
YEAR, MONTH, WEEK, DAILY  
CALENDAR WITH APPOINTMENT  
SCHEDULE.

PENNING SECTION  
FOR NOTES, SCHEDULES, INFORMATION FOR CURRENT  
PROJECTS, MEETING NOTES, ETC.

STORAGE POCKETS  
FOR BUSINESS CARDS, CALCULATOR OR  
RECHARGEABLE BATTERIES, ETC.

TRAVELING SIDEKICK SOFTWARE  
APPROPRIATE FOR YOUR COMPUTER,  
AND UPDATE ALL INFORMATION.

## Traveling SideKick is the organizer for the Computer Age!

Traveling SideKick is both a binder you take with you when you travel — and a software program — which includes a Report Generator — that generates and prints out all the information you'll need to take with you, information like your phone list, your client list, your address book, your calendar, and your appointments. (The Appointment Schedule or Calendar you're already using in your SideKick is automatically used by your Traveling SideKick. You don't waste time and effort re-entering information that's already there.)

One keystroke generates and prints out a form like your Address Book. (You don't need to change printer paper.) You simply use a standard 3-hole punch — which you can steal from someone else's desk — punch out the holes, fold and clip the form into your Traveling SideKick binder — and you're on your way. Because Traveling SideKick's binder and software are CAD (Computer Age Designed), you don't fool around with low tech tools like scissors, tape, or staples. Just one keystroke, 3 holes and you're on your way.



## You don't have a SideKick? You must be kidding.

More than half a million people already use Borland's desk top organizer, SideKick (Winner of InfoWorld's "Product of the Year" award, it is also the #1 best-seller for the IBM PC™). Anyway, if you don't have one already you need one now and we'll give you a special price break. Buy Traveling SideKick and SideKick for only \$125.00 (Sold separately they add up to \$154.90, so you save \$29.90 — which we hope you don't have to spend on cab which take you the long way to the airport).

What the software program and its Report Generator do for you before you go — and when you get back.

### Before you go:

- Prints out your Calendar, Appointments, Addresses, Phone Directory, and whatever other information you need from your data files.

### It can also:

- Sort your address files by name, zip code, or company name
- Print mailing labels
- Print information selectively
- Search files for existing addresses or calendar engagements

### When you return:

- Lets you quickly and easily enter all the new names and numbers, facts and figures you learned while you were away — into your SideKick data files
- Traveling SideKick does all of the above and more without needing special computer paper.

## If you use SideKick, you need Traveling SideKick.

Since you use SideKick, you already know how incredible and invaluable it is. And you now know that Traveling SideKick uses all the information you already have in your SideKick. No re-entry. It's that easy.

Sold separately, Traveling SideKick is only \$69.95 which is a lot less than many "dumb" organizers that are nothing more than printed books that can't generate anything except dust. (Because Traveling SideKick is electronic, it works this year, next year, and all the "next years" after that. Old-fashioned low-tech organizers are history in 365 days.) You'll be proud of your Traveling SideKick binder on planes and boats and trains. It's stylish, professional, and practical. It belongs — with you — in the Computer Age — and for only \$69.95, it belongs to you.

**Traveling  
SIDEKICK**

NOT COPY-PROTECTED

Available at finer dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8000.

*Tell me I need the perfect traveling companion.  
Send me \_\_\_\_\_ copies.*

**Minimum System Requirements:**  
128K  
*Yes, I need both Traveling SideKick and SideKick. I get them both for only \$125.00.*

Send me \_\_\_\_\_ copies.

Name: \_\_\_\_\_  
Shipping Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Telephone: \_\_\_\_\_

**60 DAY  
MONEY-BACK  
GUARANTEE**

\$69.95  
*This price includes shipping to all U.S. cities. All foreign orders add \$10 per product ordered.*

Subtotal  
(CA residents add 4.2% tax per copy)  
Amount Enclosed \_\_\_\_\_  
Payment:  MC  BankDraft  Check  
Credit Card Exp. Date: \_\_\_\_\_  
Card #: \_\_\_\_\_

**BORLAND**  
INTERNATIONAL  
4585 SCOTTS VALLEY DRIVE, SCOTTS VALLEY, CA 95068  
PHONE (408) 438-8400 TELEX 172273

Excluded in this promotional offer and Traveling SideKick is a trademark of Borland International, Inc. Borland is a registered trademark of MicroSoft International Corp. Logos is a registered trademark of Lotus Development Corp. QBasic is a registered trademark of Ashton-Tate. IBM PC, AT, and PCjr are registered trademarks of International Business Machines Corp. CPO is a registered trademark of International Business Machines Corp.

CIRCLE 139 ON READER SERVICE CARD

COO/CSB/MS/1985 Borland International B-1027A  
Circle 139 on Reader Service Card

# The fine art of business communication.

**"The ultimate in graphics resolution and performance..."**  
PC Products.

**"Making the mundane magnificent..."**  
PC Magazine.

#### The Color 400™ Card

Set the screen ablaze with 16-color graphics far superior to IBM's Enhanced Graphics Adapter. The resolution even outdoes Macintosh.

Whether you do business presentations, CAD/CAM or graphic design, you can't get better graphics without spending at least \$1,000 more.

And you can't get a high-resolution graphics card that supports more software at any price.

You see, Color 400 screens text and graphics with twice the resolution of standard cards. It not only works with popular high-resolution monitors, but also makes standard-resolution software look better. And it runs popular software written for the IBM PC, XT or AT.

High-resolution drivers for Lotus 1-2-3, "Symphony," CAD Plan, Auto CAD® and other programs are already available for Color 400, and more are on the way.

It even comes with its own paint program, the sophisticated yet surprisingly easy Paintbrush 400.

**Call for a screen test.**  
Call 408/943-9480 for the dealer nearest you—and prepare yourself to witness a revolution in resolution.

Whether you're a business person, an engineer or a graphic artist, now you can take what you do to the level of fine art. With Color 400.



**SIGMA  
DESIGNS**

2023 O'Toole Avenue  
San Jose, CA 95131  
408/943-9480



Graphics screen created with  
Lumens 90, available from  
Sigma Designs.

# LIVE MARKET QUOTES ON YOUR PC

*Watch your PC screen as your options, futures, and stocks drift, spike, plummet, and surge—all day, every market day, with continuous exchange quotes via FM radio.*

Vigorous stock and options traders can lose thousands of dollars during a choppy day on the market. To keep their shirts, they need to stay alert to transactions as they occur. By the time the stock market quotes are reported in the next morning's paper, the information is too late to be of more than archival interest to them. They need continuous quote services.

Other market professionals—brokers, money managers, investment advisors, analysts—also cannot operate without a window into the minute-by-minute transactions of the securities market. Without easy access to information about what's currently

being bought and sold, they're lost. Continuous quote services are the lifeline of their businesses.

If you're an individual investor, you also need to monitor the securities market to protect your investments. Plus, you need to track the performance of your stocks and bonds over time. Even if you don't trade daily, you can take good advantage of continuous quote services and, more important, the data such services supply for long-term analyses.



## ■ MARKET QUOTES

Signal Software							
File		Edit		Collection			
		T	LAST / BID	CHANGE	22/05	100	HOLD
AAI	144.3	+ 2.2	142.0	620.0	244.7	143.5	11.0
ABX	130.4	+ 2.2	128.0	470.0	130.5	137.7	11.0
ACB	19.0	- 0.2	19.2	260.0	19.3	19.0	11.0
ADP	89.2	- 0.2	89.4	290.0	89.3	89.0	11.0
AEG	29.0	- 0.2	29.2	290.0	29.3	29.0	11.0
AER	10.4	- 0.1	10.5	200.0	10.6	10.5	11.0
AGF	1.00	- 0.15	1.00	1.00	1.00	0.15	11.0
AGM	9.00	- 0.04	9.00	1.00	9.00	0.04	11.0
AGT	1.12	- 0.10	2.00	1.00	1.00	0.10	11.0
AMG	11.5	0.0	11.5	500.0	11.5	11.5	11.0
APY	5.0	0.0	5.0	12.0	5.0	5.0	11.0
ARO	15.2	+ 0.3	14.7	210.0	15.0	14.7	11.0

This is Signal's quote display screen, the basic product FM technology delivers to your PC. Stock tickers appear in alphabetical order in the left-hand column, and the corresponding price and volume data appear in the adjacent columns.

Now, for as little as \$1 per trading day, traders, other market professionals, and individual investors can all receive quotes continuously in a new, less expensive, more convenient way: through their PCs and an FM radio link. Two new hardware and software packages make it all possible: Signal from Lotus and Radio Exchange from Telemet America. With one of these packages and your PC, you can take advantage of the relatively new FM-to-PC quote services and receive broadcasts of quotes that stream straight from the exchange floors to your terminal.

**ALARMS AND ANALYSES** The chief benefit of these systems to investors is safety. You can set up the radio modem to watch your portfolio for you. If anything really frightful happens to one of your stocks, the PC can sound an alarm in plenty of time for you to cut your loss. Serious investors, who invest more heavily and therefore watch the market more carefully, should be able to justify the cost of an FM-to-PC link not simply in terms of dollars spectacularly won but in terms of dollars prudently protected. For them, purchasing an FM-to-PC link to a quote service is rather like installing an electronic burglar alarm to protect assets.

A second advantage for investors is the new analytical power you can tap with

your PCs after massively downloading low-cost FM data. The cost of bringing down quotes via FM is the same for 1,000 stocks as for 1 stock. The monthly charge for the FM quote service is fixed, regardless of usage. Individual investors can thus easily afford to track the performance of whole groups of stocks and then watch to see how a select few stocks are performing within and compared with those groups. FM also makes it economically feasible to keep the price-related items in a quite large fundamental database up to date on a daily or hourly basis.

In short, FM brings large-scale market analyses within your price range. Suddenly you have the luxury of access to as much up-to-the-minute price data as you want: FM delivers an incredible volume of data into your PC—and at low cost.

**QUOTE DELIVERY** Quote display terminals, sometimes called "quote machines," are indispensable to brokers, money managers, investment advisers, and some analysts. Typically fed by leased telephone lines used exclusively for this purpose, these terminals are the shop windows of the investment industry. Quote delivery is a big, strikingly profitable business. Last year, Quotron Systems Inc., the dominant domestic supplier of stock market quotes, with about two-thirds of the

Ticker	Last	Basis	Holding	Change	Cur. Val.	Gain/Loss
APL	22.1/0	22.5/0	100	1/2	\$2,212	\$50
BBN	120.0	120.0	500	1/2	\$33,000	\$3,000
C	120.0	120.0	500	1/2	\$35,157	\$3,693
CPY	32.0	32.0	100	0	\$3,200	0
GE	45.0	45.0	100	0	\$4,500	0
GM	175.0	175.0	100	0	\$17,500	0
HPQ	110.0	110.0	100	0	\$11,000	0
EPIC	1.0545	1.0545	100	0	\$1,054.50	0
WIC	0.2394	0.2394	100	0	\$23.94	0
TYC	0.50	0.50	100	0	\$50.00	0
TRW	0.34	0.34	100	0	\$34.00	0

Telemet America's program offers, in addition to a quote report screen very much like Signal's, a portfolio valuation screen. The system does the arithmetic to determine the basic valuation of the portfolio (\$93,662, in this example).

business, had revenues of \$190 million and netted \$27 million on an installed base of 72,000 terminals.

Now that PCs have become commonplace in the financial services industry, the obvious step is to dispense with quote machines and feed quotes directly into PCs. The new FM radio services now offer a less costly direct link between the marketplace and the microcomputer. And PCs have more functions than just delivering quotes; they can be used for displaying quotes, monitoring multiple portfolios, and analyzing securities in-depth—all at one time. PCs are, therefore, much more practical than dedicated quote machines

## PC FACT FILE

**Radio Exchange**  
Telemet America Inc.  
515 Wythe St.  
Alexandria, VA 22314  
(800) 368-2078  
(703) 548-2042  
**List Price:** \$199 for basic radio modem  
(follows 72 securities at once) or \$279 for expanded unit (follows 328 issues at once).  
**Personal Gains software, \$89.**  
**Requires:** 128K RAM, one disk drive, serial card, FM antenna.

CIRCLE 640 ON READER SERVICE CARD

that perform only one of these functions.

The competitive pricing of the FM-to-PC services and the fact that PCs are so prevalent and powerful are making the hardwired quote services sit up and take notice. Quotron and other quote suppliers have introduced dial-up and dedicated phone-line quote services for PCs. But FM reception cannot be absolutely reliable, and the services that offer it do not supply a dial-up backup service. So the hardwired quote services, which are as reliable as the telephone lines, will persist for professionals, even though the FM services will challenge them and, more important, are creating an entire new market—the individual investors who monitor their securities' activities and perform long-term analyses on their PCs.

**HOW IT WORKS** Commercial FM radio stations broadcast the programming you receive on your personal radio within their allotted wavebands. They also broadcast subcarrier signals, which your radio ignores. Ordinarily, the subcarriers are just wasted segments of the frequency spectrum, but they can be used to transmit information to specialized receivers. Some FM stations therefore make their subcarriers available for lease to produce extra revenue. The subcarriers are commonly leased by marketers of that bland, meandering background music you hear in elevators and supermarkets: Muzak.

In recent years, FM stock quote services have been building nationwide networks by leasing the subcarriers of commercial FM broadcast stations in every major city in the United States. In most big cities, two or three stations broadcast quotes.

Until recently, the three major FM quote broadcasting networks were Bonneville Telecommunications, Telemat America, and Dataspeed. Last summer Dataspeed was bought out by Lotus Development Corp., and the network now operates as the Lotus Information Network Corp. The sudden appearance of Lotus as a major player in this field has changed the complexion of the business: After a decade of development in relative obscurity, FM data broadcasting technology is now finding wider acceptance.

Each quote service maintains a central

computer that gathers trading data from the stock exchanges. The data is initially transmitted from the service via satellite to receivers located at FM stations in various cities. The participating commercial FM station in each city then retransmits the satellite signal on a leased subcarrier.

To pick up the FM signal with your PC, you need a radio modem. Two of the three FM quote broadcasters now offer radio modems for the PC: Lotus and Telemat America. They will supply you with a modem when you subscribe to their quote ser-

## ■ The appearance of Lotus as a major player has changed the complexion of the business. FM data broadcasting is now finding wider acceptance.

vices. Bonneville Telecommunications, which pioneered this business, currently broadcasts to dedicated display terminals but is currently developing a PC modem.

A radio modem looks like any other external modem—a black box about the size and the shape of a book. It uses its own power supply and thus you must plug it into a wall outlet. The radio modem communicates with your PC through the serial port. A cable is supplied with the modem, but you must provide the port. The modem also requires an antenna.

Electronically, the "front end" of a radio modem is an FM radio tuned to the narrow subcarrier of the station in your city. The signal is detected, amplified, and used to drive the built-in modem. From this point, it is just as though the signals had arrived by telephone. The modem converts the incoming signal into a series of bits intelligible to the PC.

Stock, options, and futures quotes are broadcast and received in an alphabetically ordered stream of ticker symbols and their

associated price/volume data. When the complete list of tickers from A to Z has been broadcast, the process begins anew at the top of the list. In practice, this ticker "tape" takes a complete loop every 2 to 8 minutes.

The radio modem, equipped with some on-board memory (typically 64K bytes of RAM), stores the ticker symbols of the stocks, options, and futures of particular interest to you. The modem watches the ticker loop and extracts from it only the prices of the designated stocks, much as you might lift an item off a revolving tray.

The most current quotes are stored in the modem's RAM, where they are held available for display on your PC's monitor. The ticker loop is broadcast over and over again, so that the modem RAM is steadily refreshed with current data from the market.

An 8-minute loop has too slow a refresh rate to provide real-time market data, so whenever a stock is traded, the new quote for this stock is instantly inserted into the loop, immediately perceived by the modem's RAM, and displayed on the terminal right away. As the trading day progresses, actively traded stocks are constantly pushing up in line on the ticker loop. As you watch the screen, you're continuously informed of price fluctuations and accumulating volume.

The practical result of all this technology is a display screen you can bring up anytime you wish in the course of a trading day. (See screen photos.) A basic screen lists your stocks (or options, indexes, or



### FACT FILE

**Signal**  
Lotus Information Network Corp.  
1900 S. Norfolk,  
San Mateo, CA 94403  
(800) S-MARKET

**List Price:** \$395 for radio modem and support software (follows 250 issues at once). Subscriptions and exchange fees additional and as appropriate.

**Requires:** PC, XT, AT, or Compaq Portable (will work with some other compatibles), 320K RAM, one disk drive, DOS 2.0 or later, serial port, FM antenna, J-2-3 or Symphony recommended.

**CIRCLE 648 ON READER SERVICE CARD**

## ■ MARKET QUOTES

commodity futures) down the left-hand column and presents tabulations of their current price—high, low, last, the tick, the change since yesterday's close, bid/asked (for OTC stocks and options), and volume data.

**RELIABILITY OF RECEPTION** The major advantage of FM broadcasting is low cost, but the price you pay is unreliable reception. Occasionally, the FM signal grows so feeble that it stops updating the quotes on your screen. In fact, you may lose your quote feed altogether in a thunderstorm. Many market professionals must therefore use FM in tandem with a high-reliability service, probably via a leased line.

When the FM service is up—nearly all the time—you can save substantial sums in usage charges on other quote terminals. When it's down, the modem alerts you immediately.

An emergency dial-up access to the ticker loop would make FM more attractive to brokers and heavy traders. For advisers, analysts, and individual traders and investors, however, FM works just fine as a standalone system.

Although neither of the indoor antennas supplied with the two FM systems I reviewed was adequate, indoor antennas will work. I hooked up rabbit ears for this evaluation (even though they make the computer look preposterous). Some people are able to use tiny antennas fashioned from paper clips (more visually acceptable). The most common reception problem arises when FM signals bounce between and among downtown buildings and produce multiple signal paths. A circular polarizing antenna is the solution.

If you live beyond the transmitting radius of a major city, however, FM is not for you. Consider a direct satellite link instead. PC Quotes in Chicago or Bonneville Telecommunications in Salt Lake City can tell you more about such links.

Both Lotus with Signal and Telemet America with Radio Exchange offer you essentially the same basic FM-to-PC product, using the same basic technology.

**SIGNAL** The Signal package from Lotus includes Lotus's radio modem and the software that supports it. Signal is aptly

named and beautifully packaged. The documentation is thorough, clear, and impressive.

The radio modem downloads quotes in real time on up to 20,000 stocks, options, and futures. It has sufficient on-board RAM to track 250 issues at any one time. If you want to track a different set of 250 stocks, you must erase the existing set and wait a few minutes for the ticker to update the quotes on the new collection of 250. You can set high- and low-price alarms on

### With Signal, if you're using your PC for some other purpose, like word processing, the modem will continue to watch over your stocks.

any stock that you track.

An attractive feature of Signal is its off-line alarm. If you're using your PC for some other purpose, like word processing, the modem will continue to watch over your stocks. If one heads south, the modem will beep. You can then reload Signal's program, examine the report screen, and discover precisely which stock is in trouble. You enter the alarm trigger levels for each security from the keyboard and set them for both high and low prices.

Signal had a previous incarnation as Dataspeed's Modio. The new package differs from the old in at least two respects, which are quickly evident: price and software. The price is somewhat higher, and the software is somewhat more promising.

Dataspeed used to offer for a rickety little bridge program to download quotes from the modem into *I-2-3*. Lotus has so completely automated this process that you can transfer quotes into the spreadsheet almost instantaneously. If you own *I-2-3* or *Symphony*, the practical benefit is this: You can set up a portfolio management worksheet for your stocks using the spreadsheet and then—from within *I-*

*2-3*—update your portfolio constantly by pulling in fresh quotes from the modem's RAM. The spreadsheet (since it is a spreadsheet) can automatically take care of expansions (100 shares × 23.88 per share = \$2,388 current value), calculate percentage gains and losses, and create totals. Instead of watching the simple tabulation of quotes provided by the basic Signal package, you can instead watch a *I-2-3* worksheet in which your complete portfolio is kept current in real time.

It's up to you to configure the spread-sheet as a portfolio manager and to write macros to scan the modem frequently for fresh quotes. Some sample worksheets are included with the program to accomplish all this, but they do not interact with the radio modem as the documentation insists they should. The Signal customer-support people confirmed when I called them for help that the sample portfolio manager did not work and, in their view at least, could not be made to work. "Just write one of your own," they suggested. "It's easier."

Setting up a simple portfolio monitor is easy, but the sample worksheet had promised more. It was supposed to keep track of both realized and unrealized capital gains. The problem is probably just an isolated macro, but I was disappointed that the program balked.

If you're a financial professional or you don't wish to devote time to spreadsheet programming for your Signal—or if you do not own *I-2-3* or *Symphony*—I suggest you look into the *Window-on-Wall-Street*

## PC FACT FILE



Window-on-Wall-Street  
Bristol Financial  
Systems Inc.

1010 Washington Blvd.  
Stamford, CT 06901  
(203) 356-9490

List Price: \$495 for basic program. Includes charting, scanning, and a historical database on 500 stocks.

Package for multiple portfolio management additional.

Requires: 384K RAM, two disk drives (hard disk recommended), color graphics card for viewing stock charts (preferably Hercules). Works with Signal hardware.

CIRCLE 647 ON READER SERVICE CARD

package from Bristol Financial Systems. *Window-on-Wall-Street* is a serious multiple-portfolio manager that includes a historical price/volume database and a good stock-charting facility. It's entirely menu driven and runs right out of the box on FM quotes from Signal.

The initial Signal package of hardware and software is \$595. Keeping it running costs \$100 a month in fees to Lotus. Because Signal conveys only real-time quotes (as opposed to 15-minute delayed quotes), you must pay fees to the exchange that is the source of the data. For individual investors these fees are not excessive: \$7.50 per month for the New York Stock Exchange (NYSE), for example. So the minimum monthly maintenance fee, for an individual investor, would be say \$105 to

(a measure of market direction). You can choose from a menu to replace this basic tabulation screen with a valuation screen for your portfolio. It displays percentage and absolute gains and losses for individual issues and for the whole portfolio and updates these computed values as fresh quotes come in. This portfolio monitor is part of the basic Telemet software; you don't have to move data into a spreadsheet to display the portfolio.

If you do want to move the quotes into a spreadsheet for processing, you can download a DIF file of current quotes and subsequently upload it into a spreadsheet or database manager. I tested this feature by downloading quotes into *I-2-3*, which is a DIF-compatible program. Within the spreadsheet, I set up a quote accumulator to stack up daily closing price and volume data for subsequent charting and analysis. The quote accumulator is like a warehouse plus a forklift truck for dealing with masses of low-cost price/volume data on the 500-odd high-technology stocks my investment advisory service monitors.

From a dial-up service the closing high, low, close, and volume data on 500 stocks daily could range from \$300 to \$700 per month. Via Telemet, it costs \$20 per month.

You can directly transfer Radio Exchange quotes to any DIF-compatible spreadsheet or DBMS. The transfer is less facile than Signal's instantaneous link to *I-2-3*, but Telemet's DIF compatibility gives you alternative places to go with the data you don't own *I-2-3* or *Symphony*.

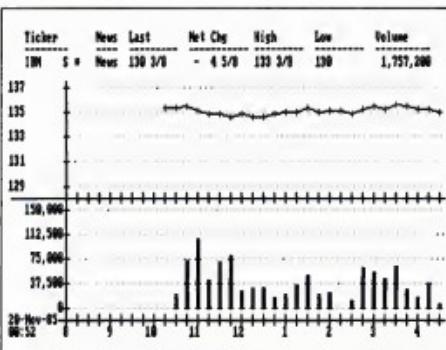
You can accumulate 30 days of data within the Telemet software; a charting facility for the month's accumulated price/volume data is also provided as a menu item. If you find charting intraday index, stock, future, or option price movements

## ■ Radio Exchange costs about \$200 less than Signal initially, and it keeps watch over 78 more stocks and futures.

\$125 per month. Professionals pay more for the service than individuals (\$68 per month for the NYSE, for example), as they would for any other quote carrier.

**RADIO EXCHANGE** Radio Exchange seems to be a better value. The fully expanded version of the modem, with software and cabling included, costs about \$200 less than Signal initially, and the monthly subscription fees are substantially lower. It keeps watch over 78 more stocks and futures at any given moment and offers more than just quotes, including corporate news items on specific companies plus weather (important information for commodities players) and even sports scores.

The software provides the standard tabulation of tickers, ticks, last prices, change since yesterday, high, low, close, bid/asked, and volume. It also calculates trin



Telemet's software accumulates 30 days of closing price and volume data for charting. To chart stocks over longer periods, the FM data can be accumulated in a spreadsheet or a DIF-compatible charting package.

useful, Radio Exchange will handle that core, too.

The basic subscription fee is \$25 per month for all exchanges. This charge entitles you to 15-minute delayed quotes. If you prefer real-time quotes, Telemet typically charges \$10 a month plus an exchange fee. For NYSE and American Exchange (AMEX) quotes in real time, the charges come to about \$48 a month for individual investors. (For my own purposes the 15-minute delayed quotes are timely enough—and my company often trades options on OTC issues, which are notoriously slippery.) If you subscribe to Telemet's service for 3 years, you get rate protection over that period and the monthly fee drops to \$20 per month, or about \$1 per trading day.

Radio Exchange's RAM keeps watching your stocks while you're using your computer for other work, but it does not issue an audible alarm on preset trigger prices. You should thus load the program at regular intervals to check for any alarms, which appear as flashing bars across the tabulation of stocks. This limitation aside, the Telemet Radio Exchange package strikes me as a more-sensible investment than Signal. ■

*Michael Gianturco is president of High Technology Investments, an investment advisory service in Houston.*



# IBM COMPATIBILITY

*...at a not so IBM price*

## TECH TURBO PC/AT \$2399

### PRICE INCLUDES:

- 6 TO 8 MHZ 80286 CPU
- 512K
- ONE, 1.2 MB FLOPPY DRIVE
- 8 EXPANSION SLOTS
- 195 WATT POWER SUPPLY
- COMPLETE MS DOS, PC DOS, XENIX COMPATIBILITY
- RUNS LOTUS 123, DBASE III FRAMEWORK AND ALL OTHER POPULAR AT SOFTWARE
- ONE YEAR WARRANTY!!

### OPTIONS:

- TECH TURBO PC/AT WITH 20MB HARD DISK **\$2825**
- TECH TURBO PC/AT WITH 20MB HARD DISK, MONOCHROME MONITOR, HERCULES® COMPATIBLE MONOGRAPHICS CARD **\$2999**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.

## TECH PC/AT \$1999

### PRICE INCLUDES:

- 6MHZ 80286 CPU
- 512K
- ONE, 1.2 MB FLOPPY DRIVE
- 8 EXPANSION SLOTS
- 195 WATT POWER SUPPLY
- COMPLETE MS DOS, PC DOS, XENIX COMPATIBILITY
- RUNS LOTUS 123, DBASE III FRAMEWORK AND ALL OTHER POPULAR AT SOFTWARE
- ONE YEAR WARRANTY!!

### OPTIONS:

- TECH PC/AT WITH 20 MB HARD DISK **\$2699**
- TECH PC/AT WITH 20MB HARD DISK, MONOCHROME MONITOR, HERCULES® COMPATIBLE MONOGRAPHICS CARD **\$2699**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.

## TECH TURBO PC/XT \$1099

### PRICE INCLUDES:

- 4 TO 7 MHZ SOFTWARE SWITCHABLE CPU
- 640K
- TWO 360K DS/DD FLOPPY DISK DRIVES
- 8 EXPANSION SLOTS
- 135 WATT POWER SUPPLY
- ONE YEAR WARRANTY!!

### OPTIONS:

- TECH TURBO PC/XT WITH 20MB HARD DISK **\$1699**
- TECH TURBO PC/XT WITH 20MB HARD DISK, MONOCHROME MONITOR AND HERCULES COMPATIBLE MONOGRAPHICS CARD **\$1950**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.

## TECH PC/XT \$799

### PRICE INCLUDES:

- 4.77 MHZ CPU
- 256K
- TWO, 360K DS/DD FLOPPY DRIVES
- 8 EXPANSION SLOTS
- 135 WATT POWER SUPPLY
- ONE YEAR WARRANTY!!

### OPTIONS:

- TECH PC/XT WITH 20MB HARD DISK **\$1449**
- TECH PC/XT WITH 20MB HARD DISK, MONOCHROME MONITOR, HERCULES COMPATIBLE MONOGRAPHICS CARD **\$1649**
- ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.

HI-TEK PGS AVT TAXAN IBM AMDEK HERCULES GENOA PARADISE TEAC TOSHIBA HARDWARE/SOFTWARE  
NETWORKING HAY'S AST JRAM HI-TEK PGS AVT TAXAN AMDEK HERCULES GENOA PARADISE TEAC TOSHIBA  
PLEASE ALLOW ONE WEEK VISA,  
FOR SHIPPING MASTERCHARGE

TELEX: 272006 Answer Back-TECH FAX: 714/556-8325

CIRCLE 328 ON READER SERVICE CARD

TECH PERSONAL COMPUTERS  
2131 South Hathaway, Santa Ana, California 92705

©1985 TECH PC AT and AT are registered trademarks of International Business Machines Corp.

**714/754-1170**

\*Hercules is a registered trademark of Hercules Computer Technology

**TECH PC**

# AN ALL-INCLUSIVE ACCOUNTING LIBRARY

*library\ li-brer-ē\ 1: any classified group of objects, collected and arranged for use or study.*

**C**onsistent with this definition, DynaMicro Software Corp. has developed an impressive collection of fully integrated accounting applications aimed at the high end of the PC accounting system market. This system, called *The Business Library*, was originally written for a multiuser environment and has been available for the PC since 1982.

*The Business Library* system contains eight accounting modules: General Ledger, Accounts Payable, Accounts Receivable, Sales Order Entry, Inventory, Payroll, Purchase Order Tracking, and Time Accounting and Project Tracking. Three utility modules—Librarian, Business Analyzer, and Information Retrieval—complete the basic accounting system. Several other complementary modules are available from DynaMicro, including programs for word processing and tax planning.

We reviewed the single-user version of this package using an IBM PC-XT. DynaMicro recently introduced a multiuser version of its accounting software based upon 3Com's local area network (LAN). We were told by representatives from the company that it would soon release multiuser versions utilizing both the IBM PC Network and Novell Inc.'s Netware LAN.

The Librarian module, which you need

to run the other applications, controls the installation of each package. This process consists of establishing passwords and other parameters required to run the system (printer codes, company name, drive designations, and so forth). Once you've installed the Librarian, you can install any or all of the other modules as you need them.

In general, we were impressed with *The Business Library* software. However, of all aspects of this capable package, we were least impressed with the ease of installation. Although tasks are explained in detail, more-complete batch files would improve the installation process because the many steps you must go through make it a bit cumbersome. However, our impression of the system improved as we grew more familiar with the software.

*The Business Library* employs a somewhat unique approach to accessing all of the ancillary functions associated with processing transactions. It uses the transaction entry screen to control the entry, modification, inquiry, deletion, printing, and posting of transactions. Straying from the typical multilevel menu structures, *The Business Library* uses function keys to control all of these functions through a single screen. As we became familiar with the system, we found it convenient to be able to enter, print, and post information without leaving the original transaction entry screen. Furthermore, we found that displaying these functions at the bottom of the screen reminded us to complete the re-



*DynaMicro Software's *The Business Library* offers a powerful set of integrated applications modules with impressive features. Not an easy program, it's best-suited for users with computer and accounting training.*



**CAD**

SOFTWARE • PLOTTERS • DIGITIZERS  
CARDS • LASERS • MONITORS

**NEW\***

NETWORK UNDER \$1000

## LOWEST Prices ANYWHERE

\*IPS-100 (Intelligent Peripheral Switch) Controlled by "esc esc n" codes from any keyboard or software. Serial & parallel inputs, 3 serial & 3 parallel outputs, converts, status lights, adj. baud, bidirectional. Full warranty \$399

### PRINTERS • PLOTTERS • DIGITIZERS

AXIOM	
DX2000/DX2500	\$258/316
CALCOMP	CALL
CITIZEN	
MSR-10/15 160cps	\$235/235
MSP-10/15 200cps	294/294
*PRINTERE 35 . . . . .	379
CITON (Ritman, Epson Exact)	CALL
EPSON (All models)	LOW
ENTER (Sweet P. Pen Plotter, HP Comp.)	\$695
HITACHI	CALL
HOUSTON INSTRUMENTS	CALL
JUKI	
5510 180cps (color option) . . . . .	\$339
6100 . . . . .	334
6200/6300	549/639
KURTA	CALL
LEGEND (Sip Dot head w/Lite Time Wait, EPSON Compatible)	CALL
1385 IBM 160cps	249/238
NICOLET	CALL
SUMMAGRAPHICS	CALL
TOSHIBA	LOW

### MODEMS • MONITORS

AMDEX (All Models)	CALL
ANCHOR AUTOMATION	
JOHNSON Controls 12 (1200 baud)	\$164
Expander 1000 EXT-INT (HAYES Compatible)	235/199
HAYES	CALL
MITSUBISHI Monitors	CALL
NOVATION (HAYES Compatible)	
Smart Cat+ 2400 IBM & MAC . . . . .	\$499
*2400 Half Card Encryption	\$649
Smart Cat+ 1200 w/ Modem 810B	\$219
*Com+ Network (8 stations)	\$199
TELE Modems	CALL
TAZAK	
121 . . . . .	\$116
510/600 RGB	215/239
630/640 RGB	379/438
PRINCETON GRAPHICS	LOW

### COMPUTERS • CARDS

T-ARRAY TECHNOLOGIES Graphics	\$209
ARTIST I & II	CALL
COMPAC . . . . .	BEST
CORONA PC (100%)	
PC400-22 (Mon., 256k, 20+ports, Dos, Basic) . . . . .	1296
PC400-HD (20 Meg Hard Disk)	1720
DEHOUX Spectrum Graphics	255
IBM PC, XT, AT	CALL
LEADING EDGE	CALL
PANASONIC (SR & EXEC)	CALL
*PC-X2 6800-XT clone, 256k, 16x, keyboard . . . . .	\$479
SIGMA	
MAXIMUS . . . . .	139/259
1000LOR 300 EGA . . . . .	339
COLOR 400 . . . . .	339
SPERRY PC/GT 440D, 1M ram, keyboard . . . . .	\$3290
ZENITH keyboard, 2 ports, dos-based, graphics, 256k	1495/1619

### SOFTWARE

CAD System [AutoCAD, PCplot, Digitizer, Plotter] . . . . .	CALL
CPI+ GL, AP, AR, PR	299
ENABLE	CALL
LOTUS 123/STY	299/399
SIDEWAYS	

### M.H.I. WAREHOUSE

5521 N. 20th Street #102E1

Phoenix, AZ 85064

TOLL FREE with order

VISA

802-995-1134

PO's WELCOME Thanks NASA

Prices reflect 5% Cash Discount. Shipping on most items \$8.00. Prices and availability subject to change without notice. Send cashier's check or money order. All other checks delay shipping 2 weeks. ADD \$165

## ■ THE BUSINESS LIBRARY

quired printouts and postings.

The *Business Library* supports multi-level password security. When you install the system, you create a password for each user specifying which programs each user will be allowed to access and execute.

In printing reports, you can direct them to a disk file by specifying a disk filename instead of the printer. However, when we tried to specify the screen (CON: or SCR:N), the system aborted and gave us a fatal error, forcing us to reboot the system.

**ACCOUNTS RECEIVABLE** The Accounts Receivable module functions nicely as either a standalone package or as an integral part of *The Business Library*'s Sales Order Entry module. As is the case with other *Business Library* modules, it integrates neatly with the General Ledger. Some comparable packages "book" all accounts-receivable financial transactions to single cash and accounts-receivable accounts. *The Business Library* allows you to establish up to four general ledger accounts for both cash and accounts receivable, which you use for recording cash and customer invoices. In addition, it allows four different finance charge percentages and three variable aging periods. The installation procedures for this module guide you in establishing these parameters. You must also enter sales personnel and customer information before you can begin invoicing operations.

The sales personnel function captures the salesman number, a name and address, and sales data for the period, year to date, and last year. The salesman number is used to create a list of sales by salesman for the period, a report that is usually adequate to assist you in determining salesman commissions.

The customer master file contains all of the codes and information for managing and controlling your customer accounts. The package is generous, allowing four lines of name and address before the city, state, and ZIP code. You can enter a phone number, a credit contact, a credit rating, and a "class" code such as an SIC code by which to group your customers. These codes are handy for sorting certain of your customer-related reports. For control purposes, you can enter a credit limit. The system will alert you if you enter a sale that

exceeds the established credit limit. You establish codes for tax rates, finance charge percentages, and discount rates by customer, so that the transaction entry programs can perform these calculations automatically at the time of invoice entry. You can maintain customer records using either the "open item" (tracking specific invoice amounts) or the "balance forward" (tracking a single customer balance) method, and you can have the system produce customer statements weekly, monthly, or not at all for each customer.

The system receives invoice data directly from the Sales Order Entry module. In addition, you can enter invoice data manually, or you can set up recurring invoices to be generated periodically. The invoice entry screen, used to capture invoices, displays a running batch total as well as a total of the detail that you have entered so that you can "batch total" your invoices for control purposes. We found this method of invoicing to operate quite smoothly.



**G. William Dauphinair** is a management consulting services partner in the Sacramento, California, office of Price Waterhouse and has long been a regular writer of and contributor to *The Price Waterhouse Report*.



**Mike Falkner** is a management consulting services manager in Price Waterhouse's Sacramento office, where he specializes in evaluating microcomputer accounting packages for Price Waterhouse clients.



**Pat Fitzhenry** is an MCS consultant in Price Waterhouse's Sacramento office. His specialty is installing microcomputer accounting systems for Price Waterhouse clients.



That's not unusual.

Most business software is designed to fit the average business. So if your business isn't average, most software doesn't fit.

Fortunately, you have an alternative.

The SBT Database Accounting Library. The business software you can change to fit your business.

It's modular. So you can buy only the modules that best fit your business. And if the modules aren't a perfect fit, you can customize them. In just a few hours.

Because unlike other software companies, we give you the source code (the key to changing our software) absolutely free. What's more, changes are simple to make because our software is written in easy-to-use dBASE.

And if the idea of changing software programs makes you uneasy, not worry. There's a consultant near you who can do it for you.

Our software runs with dBASE III or dBASE II.\* So not only do you get the power and flexibility of those best-selling database

management programs, you can use any computer that runs dBASE.

The SBT Database Accounting Library.

Now you can run your business like nobody's business but your own.

Call today for our demo disk and brochure.  
(415) 331-9900.

**THE SBT DATABASE ACCOUNTING LIBRARY.**

dProfessional	Time & Billing	\$395
dOrder	Sales Order processing	\$195
dInvoice	Billing/Inventory Control	\$195
dStatement	Accounts Receivable	\$ 95
dPurchase	Purchase Order	\$195
dPayable	Accounts Payable	\$295
dPayroll	Payroll/Labor	\$395
dLedger	General Ledger/Finance	\$395
dAssets	Asset/Depreciation	\$295
dProject	Project/Job Accounting	\$395
dBackup	Menu/Backup	\$ 65



Three Harbor Drive  
Sausalito, CA 94965  
(415) 331-9900

Does your software  
run like  
everybody's business  
but your own?



Accounting Software Library  
in dBASE II®/dBASE III®

Let an SBT consultant show you how our source code sets you free.

**ALABAMA**

Birmingham  
Riley Systems  
805/299-1472

**ARIZONA**

Phoenix  
Educational Consultants  
602/838-8546

**CALIFORNIA**

Chico  
Entertainment Computers  
701/397-8336

**Toronto**

Software Service Center  
714/539-3399

**Los Angeles**

Software Superstore  
313/203-1494

**Sacramento**

ComputerTech Integrations  
916/488-1653

**San Diego**

National Computer Specialists  
719/531-7787

**Bonita**

Access In Software  
415/751-2151

**San Jose**

ESKO Computer Services  
408/347-1226

**Stockton**

HCC Computer Technologies  
209/478-4275

**Rancho**

Computer Classes  
818/703-1893

**CANADA**

Toronto  
Management System Resources  
416/598-4982

**CONNECTICUT**

Dudley  
Western Commercial Computers  
203/392-1231

**COLORADO**

Denver  
Delaware and Associates  
303/379-4117

**FLORIDA**

FT. Myers/Sarasota  
Entech Computer Center  
813/273-5110

**Miami/Coral Gables**

Software Doctor  
305/446-5134

**GEORGIA**

Atlanta  
PSI Systems  
404/524-1200

**HAWAII**

Honolulu  
Data Center Hawaii  
808/528-7812

**IDAHO**

Bethel  
Software Center H.E.C.  
208/336-4242

**ILLINOIS**

Bronxville  
Software First  
312/475-7337

**Massachusetts**

Wellesley  
Database Business Computer Store  
617/422-3400

**Louisiana**

Baton Rouge  
Systems Services  
504/766-3433

**MASSACHUSETTS**

Beverly  
Database Business Computer Store  
617/422-3400

**MICHIGAN**

Detroit/Flint/Boggs  
Data Center  
313/625-7446

The above listed dealers are independent consultants, SBT makes no representation, express or implied, with respect to their qualifications, competence, or the performance of their services.

**MISSOURI**  
Benton  
Source Technology  
816/365-1666

**NORTH CAROLINA**  
Durham  
Todd Pringle Associates  
919/471-2990

**NEW JERSEY**  
Atlantic City  
Atlantic City Typewriter  
609/445-1123

**Newark**  
MetLife Strategic  
201/529-7721

**NEW MEXICO**  
Albuquerque  
Scientific Micro Products  
505/265-7902

**NEW YORK**  
Long Island  
CONSULTECH  
516/724-6111

**New York City**  
CCS Inc.  
212/486-7320

**New York City**  
Q-M Consulting  
212/475-2323

**Oouting**  
Professional Data Systems  
914/783-4008

**Rochester**  
Schneider Data Consultants  
716/342-4184

**Syracuse**  
Oneida  
315/448-1284

**OHIO**  
Cleveland  
Common Sense Software  
313/341-0011

**Cleveland**  
Electronic Business Systems  
216/481-8363

**PENNSYLVANIA**  
Philadelphia  
Manhattan Software  
717/269-2846

**Springfield**  
Micro Endorsers  
215/328-4530

**Wilkes-Barre**  
East Computer Center  
717/545-4900

**TEXAS**  
Houston  
Knox Computer  
713/471-4900

**San Antonio**  
Prompt Business Systems  
512/377-3245

**UTAH**  
Boise  
Benchmark Systems  
401/396-8200

**VIRGINIA**  
Arlington  
Smart Soft  
703/425-2252

**VERMONT**  
Waterbury  
Computer Consultants  
802/466-3156

**WISCONSIN**  
Milwaukee  
Micro Resource Inc.  
414/257-3313

**La Crosse**  
Micromage  
608/785-6275

## ■ THE BUSINESS LIBRARY

voice. Like the invoice screen, the cash receipts process is quick and easy to follow.

Based on the information you have coded for each customer, the system will automatically generate statements weekly and monthly and add the appropriate service charges to the accounts of customers who are late in making payments. Unfortunately, the statement format is predefined, so you can't tailor its appearance to your specific needs.

In addition to the basic accounts-receivable reports you'd expect in such a package, additional features are included that

## ■ The bill of materials processor represents the most dramatic difference between The Business Library and comparable accounting packages.

enhance the overall usefulness of the system. For example, you can print mailing labels sorted by customer or classification, and you can create custom dunning letters with your own word processor and import them into *The Business Library*.

**INVENTORY CONTROL** The Inventory module is a cornerstone in *The Business Library* system. It integrates with the General Ledger, Accounts Payable, Purchase Order Tracking, and Sales Order Entry modules. In addition to being a full-featured inventory control system, it also acts as a capable bill-of-materials processor. In setting up the system, you are given a choice of four costing methods: LIFO, FIFO, average cost, and standard cost. You can also establish multiple inventory sites and sections (locations) within those sites. You can set up product category codes that allow you to group your inventory by type of product and designate the general ledger accounts that are affected by transactions for this item's category.

The screen used to establish your invent-

ory items contains the obligatory item code, description, unit of measurement, cost, quantities (on hand, on order, committed, and in transit), and reorder information. In addition, the system allows you to establish for each item three vendors, a substitute part number (for the bill of materials), a cycle count (for physical inventories), and sales tax applicability (for order entry). When you use the site code, the system will keep physical inventories by site for each item number. This kind of multiple-site inventory-tracking ability is a rarity among microcomputer-based accounting systems.

The Inventory module is neatly integrated with the Purchase Order Tracking and Sales Order Entry modules—it receives the bulk of the transaction data directly from other modules. Inventory adjustment transactions can be entered using two methods. An inventory adjustment screen lets you quickly adjust quantities to reflect damaged goods, shrinkage, data entry error, and so forth. A physical inventory function provides for similar adjustment to item quantities but controls these changes with tag numbers, tag counts, and quantity hash totals to help ensure that an accurate physical inventory count was made. The system can produce detailed journals to properly document these changes.

The Inventory module creates a variety of valuable reports in addition to the standard master file lists. They include a purchase requirements list based on predefined order points for each item, an inventory valuation list, an inventory price/cost comparison, a cycle count list for taking physicals on a periodic basis, and lists of uncommitted, overstocked, and obsolete items. Each of these reports is available by site and for the entire inventory.

As previously mentioned, the Inventory module also has a bill-of-materials processor. By combining item numbers that you use for your regular inventory, you can create "assemblies" (bills of materials) that include parts, labor, and other assemblies and subassemblies. The labor items in an assembly are entered into another master file where you indicate the unit of measure and the general ledger account to which labor charges are to be posted.

# COMPUTER MAIL ORDER

## THE CMO ADVANTAGE

- THE BEST PRICES!
- Next day shipping on all in stock items.
- Free easy access order inquiry.
- Orders from outside Pennsylvania save state sales tax.
- Free technical support with our factory trained technical staff.
- There is no limit and no deposit on C.O.D. orders.
- There's no extra charge for using your credit card. Your card is not charged until we ship.
- No waiting period for cashier checks.
- We accept purchase orders from qualified corporations. Subject to approval.
- Educational discounts available to qualified institutions.
- FREE CATALOG MEMBERSHIP**

### ORDER LINE

CALL TOLL-FREE  
**1-800-233-8950**  
**CUSTOMER SERVICE & TECH SUPPORT**  
 1-717-327-1450

Dept. B102

### MAILING ADDRESS

Computer Mail Order  
 Dept. B102  
 477 East Third Street  
 Williamsport, PA 17701



MEMBER DIRECT MARKETING ASSOCIATION

### CREDIT CARDS



### SHIPPING

Add 3%, minimum \$5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returns shipments may be subject to a restocking fee.

### CANADIAN ORDERS

**1-800-268-3974**  
 Ontario/Quebec

**1-800-268-4559**  
 Other Provinces

**1-416-828-0866**  
 In Toronto

**TELEX: 06-218960**

2505 Dunwin Drive,  
 Mississauga, Ontario  
 Canada L5L1T1

All prices shown are for U.S.A.  
 orders.  
 Call The Canadian Office for  
 Canadian prices.

### DRIVES

#### HARD

##### μ SCSI

10 meg Internal IBM	\$399.00
20 meg IBM	\$549.00

##### LS-128A

10 meg Bernoulli Box	\$1899.00
20 meg Bernoulli Box	\$2499.00

#### TALLGRASS TECHNOLOGIES

25, 35, 50, 80 meg (PC)	from \$1499.00
-------------------------	----------------

#### IRWIN

Tape Backup	CALL
-------------	------

#### SEVERE-X

60 meg internal tape backup	\$799.00
-----------------------------	----------

#### FLOPPY

Tandon	1000
--------	------

#### TEAC

320K 5 1/4"	\$109.00
-------------	----------

#### MODEMS

##### ANCHOR

Vokamodem	\$59.95
Vokamodem 300/1200	\$189.95
Signamodem Express	\$259.00
Lightning 2400 Baud	\$399.00
Express halfcard	\$189.00

#### Hayes

Smartmodem 300	\$139.00
Smartmodem 1200	\$389.00
Smartmodem 1200B	\$358.00
Smartmodem 2400	\$599.00
Smart Com II	\$89.95
Chronograph	\$199.00
Transit 1000	\$309.00

#### SEVEREX

1200 Internal Watchware	\$199.00
-------------------------	----------

#### AST

Reach 1200 Baud Half Card	\$369.00
---------------------------	----------

#### Novation

J-Cat	\$99.99
Smart Cat Plus	\$319.00
Novation 2400	\$499.00

#### QUADRAM

Quadmodem II	330.00
300/1200	349.00

#### INTERFACES

##### FRONTPAGE

Microbuffer	from \$169.00
-------------	---------------

##### QUADRAM

Microlazer	from \$159.00
Ether (Epson)	from \$79.95

#### DIGITAL DEVICES

Printer Buffer 16K	\$74.95
--------------------	---------

#### GRAPHICS

##### Polaroid

Palette	\$1299.00
---------	-----------

##### AMARAY

### MONITORS

#### AMDEK

300 Green	\$129.00
300 Amber	\$139.00
310 Amber IBM-Plug	\$169.00
Color 300 Composite	\$179.00
Color 500 Composite/RGB	\$289.00
Color 710 Long Phosphor	\$489.00
Color 720 IBM Enhanced	\$329.00

#### NEC

JB 1270 Green	\$99.00
JB 1275 Amber	\$99.00
JB 1280 G TTL/1285 A TTLies	\$129.00
JC 1250 Compose Color	\$179.00

JC 1460 Color RGB	\$269.00
-------------------	----------

#### PRINCETON

MAX-12E Amber	\$179.00
HK-9 5" RGB	\$159.00
HK-8E Enhanced	\$159.00
HK-12 12" RGB	\$469.00
HK-12E Enhanced	\$559.00
SR-12 Hi-Res	\$599.00
SR-12P Enhanced	\$649.00

#### TAXAN

115 12" Green Mono	\$119.00
116 12" Amber Mono	\$129.00
121 Green TTL	\$139.00
122 Amber TTL	\$149.00
810 510/220 RGB	\$NEW
810 540/200 RGB	\$NEW
530 540/200 RGB	\$NEW
640 720/400	\$NEW

#### QUADRAM

8400 Quadochrome	\$479.00
8410 Quadochrome II	\$339.00
8420 Amberochrome	\$179.00
8500 Quad Screen	\$1499.00

#### DISKETTES

##### maxell

3 1/2" SS/DD	\$24.99
3 1/2" DS/DD	\$34.99
5 1/4" MD-1 w/Hardcase	\$18.99
5 1/4" MD-2 w/Hardcase	\$18.99
5 1/4" MD-2 HD for AT	\$39.99

#### Verbatim

5 1/4" SS/DD	\$19.99
5 1/4" DS/DD	\$24.99
Disk Analyzer	\$24.99

#### Dennison

Elephant 3 1/2" SS/DD	\$29.99
Elephant 5 1/4" SS/DD	\$13.99
Elephant 5 1/4" SS/DD	\$15.99
Elephant 5 1/4" DS/DD	\$16.99
Elephant Premium 5/3D.../SS	\$22.99

#### IBM

5 1/4" DS/DD Floppy Disk (box of 10)	\$25.99
--------------------------------------	---------

#### AMARAY

Flip-in File 10	\$34.99
Flip-in File 50	\$17.99
Flip-in File 50 w/lock	\$24.99
Flip-in File (10000 ROM)	\$11.99
Flip-in File 100	\$24.99

#### AMARAY

50 Disk Tub 2 1/2"	\$9.99
30 Disk Tub 3 1/2"	\$9.99

#### PRINTER

##### Canon

A40	CALL
LBP-8A1	CALL

##### CITIZEN

MSP-10 (90 col.)	\$279.00
MSP-15 (132 col.)	\$369.00
MSP-20 (160 col.)	\$459.00
MSP-25 (192 col.)	\$509.00
MSP-35 (120 col.)	\$449.00

##### C.T.O.H.

Prowriter 7500	\$169.00
Starwriter 1500	\$149.00
Starwriter 10-30	\$459.00
CI 3500	CALL

##### CONRAD

Laser LP-300	\$279.00
DIAZ	CALL
D25 Daisywheel	\$348.00
D35 Daisywheel	\$1098.00
D40F Daisywheel	CALL
D20 Daisywheel	\$299.00

##### DIABLO

D25 Daisywheel	\$348.00
D35 Daisywheel	\$1098.00
D40F Daisywheel	CALL
D20 Daisywheel	\$299.00
2000	\$749.00

##### EPSON

Homewriter 10, LX-80, LX-90	CALL
FX-85, FX-280, RX-100, RX-100	CALL
DX-10, DX-20, DX-35	CALL
SD-2000, SD-80, SD-80, AP-100	CALL
LD-800, LD-1000, LD-1500	CALL

</

SPECIAL THIS MONTH

Introductory Offer

# PARADISE

S Y S T E M S . I N C.

**Color/Mono**

**Card \$119.00**

## SOFTWARE FOR IBM

### ASHTON-TATE

Framework 3...	\$389.00
dBASE II...	\$299.00
dBASE III...	\$369.00



Turbo Pascal 3.0...	\$49.99
SuperCalc ...	\$44.99
Sidekick (Unprotected)	\$59.99
Reflex ...	\$64.99
Lightning ...	\$59.99

### BRODRENSBUND

Printshop ...	\$38.99
Graphics Library ...	\$24.99
<b>CENTRAL POINT</b>	
Copy II PC Backup ...	\$29.99
PC Option Board ...	\$84.99

### Continental Software

Home Accountant Plus ...	\$79.99
1st Class Mail ...	\$79.99
Tax Advantage ...	\$44.99

### DECISION RESOURCES

Charmaster ...	\$229.00
Signmaster ...	\$169.00
Diagram Master ...	\$219.00

### FIFTH GENERATION

Feedback ...	\$99.99
<b>FIRST STEP</b> ...	

Golf's Best ...	\$34.99
-----------------	---------

### ENERTRONICS RESEARCH

Energraphics/Pitter ...	\$259.00
-------------------------	----------

### FUNK SOFTWARE

Sideways ...	\$39.99
<b>HARVARD SOFTWARE INC.</b>	
Harvard Project Manager ...	\$209.00

Total Project Manager ...	\$265.00
---------------------------	----------

### Hayes

Please (Date Base) ...	\$199.00
------------------------	----------

### IMPACTOR

Cornerstone ...	\$269.00
-----------------	----------

### Lifetree

Volkswriter Deluxe ...	\$159.00
------------------------	----------

### LIVING VIDEO TEXT

Think Tank ...	\$109.00
----------------	----------

### Lotus

Symphony ...	\$429.00
--------------	----------

### MCGA

Manage Your Money ...	\$99.99
-----------------------	---------

### MicroPro

Easy ...	\$119.00
----------	----------

WordStar 2000+ ...	\$299.00
--------------------	----------

WordStar Professional ...	\$299.00
---------------------------	----------

WordStar Professional Pack w/G. Demo ...	\$189.00
--	----------

1-800-233-6950

## PC COMPATIBLES

### IBM PC IBM-XT IBM-AT SYSTEMS

Configured to your specifications.

Call for the price and availability of your system requirements.



Sales (7300) ...	CALL
6300 ...	CALL

### COMPAG

Portables ...	CALL
Desk Pros ...	CALL
AT266 ...	CALL
KAYPRO	CALL
KP-2000 Portable ...	CALL

### SANYO

MBC 550-2 Single Drive ...	CALL
MBC 555-2 Dual Drive ...	CALL
875 Portable ...	CALL
880 Desktop ...	CALL
775 Portable ...	CALL

## ACCESSORIES

### MEMORY CHIPS

4164 RAM Chips ...	(ea.) \$1.59
128 RAM Chips ...	(ea.) \$5.99
256 RAM Chips ...	(ea.) \$4.99

### KEYBOARDS

key tronic	
KBS150/KBS151/KBS151J ...	CALL
KBS152/KBS153/KBS154/KBS154J ...	CALL
The Chairman ...	\$469.00
Bob Board ...	\$359.00
Mini Mon ...	\$159.00

### AST

Rampage ...	\$369.00
Six Pack Plus ...	\$229.00
IO Plus II ...	\$139.00
Advantage AT ...	\$199.00
Graph Pro (\$4K) ...	\$399.00
MonoGraph Plus ...	\$399.00
Preview Mono ...	\$299.00
PC Net Cards ...	\$379.00
525/11 On-line ...	\$669.00

### MFLEX

The Chairman ...	\$469.00
Bob Board ...	\$359.00
Mini Mon ...	\$159.00
Five Pack C. S. ...	\$139.00
Color 400 Princeton ...	\$479.00

### PERSYST

Captain ...	\$199.00
Captain Jr. 128K ...	\$199.00
Graphic Master ...	\$469.00
Multi Display Card ...	\$219.00
Five Pack C. S. ...	\$139.00

### PARADISE

Color/Mono Card ...	See Special
Modular Graphics Card ...	\$259.00
Multi Display Card ...	\$219.00
Five Pack C. S. ...	\$139.00
Color 400 Princeton ...	\$479.00

### TECH-MR

Captain - 64 ...	\$199.00
Captain Jr. 128K ...	\$199.00
Graphic Master ...	\$469.00
Quadport AT ...	\$119.00
Liberty-AT (128K) ...	\$349.00

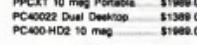
### QUADRAPI

The Gold Quadboard ...	\$449.00
The Silver Quadboard ...	\$329.00
Expanded Quadboard ...	\$199.00
Liberty-PC ...	\$309.00
QuadSprint ...	\$499.00
QuadLink ...	\$399.00
QuadColor ...	\$199.00
QuadX Expansion Chassis ...	\$399.00
Expansion Chassis Memory ...	\$169.00
Chromograph ...	\$79.99
Parallel Interface Board ...	\$64.99

CIRCLE 12 ON READER SERVICE CARD



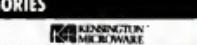
Sperry HT ... As Low As ...	\$1749.00
Sperry IT ... As Low As ...	\$1989.00
Call for Specific Configuration!	



PPC400 Dual Portable ...	\$1289.00
PPC400 10 meg Portable ...	\$1989.00
PC40022 Dual Desktop ...	\$1389.00
PC400-HD2 10 meg ...	\$1989.00



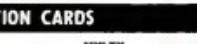
PC-138 Series ...	CALL
PC-148 Series ...	CALL
PC-158 Series ...	CALL
PC-160 Series ...	CALL
PC-171 Series ...	CALL
AT-200 Series ...	CALL



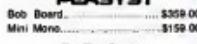
Master Price ...	\$99.99
Master Price Plus ...	\$119.00



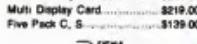
Side Mount SS-1 ...	\$19.99
Diamond SP-1 ...	\$19.99
Emerald SP-2 ...	\$44.99
Sapphires SPF-1 ...	\$59.99
Ruby SPF-2 ...	\$69.99



Color/Mono Card ...	See Special
Modular Graphics Card ...	\$259.00
Multi Display Card ...	\$219.00
Five Pack C. S. ...	\$139.00
Color 400 Princeton ...	\$479.00



Captain ...	\$199.00
Captain Jr. 128K ...	\$199.00
Graphic Master ...	\$469.00
Quadport AT ...	\$119.00
Liberty-AT (128K) ...	\$349.00



The Gold Quadboard ...	\$449.00
The Silver Quadboard ...	\$329.0

# This is for all the power users technologies before they

Other than Steve Wozniak and Jonathan Rotenberg, there are probably only 2,998 personal computer users who qualify as trend setters. They're the people who owned Apples® when everyone else thought Apple® was a record label. People who were called hackers when a hacker was someone no one wanted to play golf with.

However many of you there are, this ad is for you. It's been designed and written to introduce you to a new technology without using superlatives or words like revolutionary. (We're saving those words for future ads targeted at the general consumer.)

The new technology is called the Softstrip™ System. This ad tells you what it's all about.

## THE SOFTSTRIP SYSTEM ENCODES DATA ONTO PAPER

Softstrip technology allows text, graphics, even digitized sound to be encoded on a strip of paper. Providing an alternative to magnetic media and telecommunications for the recording, distribution and retrieving of information.

These data strips, each a structured pattern of black and white rectangles that look something like a condensed bar code, can be encoded with special software and read with a scanning device called the Cauzin Softstrip System Reader. The reader optically scans the strip, translates its contents into 8-bit code and feeds it into a personal computer's serial or cassette port, enabling automatic, error-free entry of printed data without using a keyboard.

publishers), or by using a laser or dot matrix printer and special software (appropriate for personal or business use).

If you want, you can generate strips that can be reproduced on a copier or versions that can't be. Either way, any data strip, whether it's printed in a newspaper, magazine or personal letterhead, can survive pen marks, scratches, even coffee stains.

Basically, anything you can put on a magnetic disk you can put on a Softstrip data strip, which should suggest numerous application possibilities.

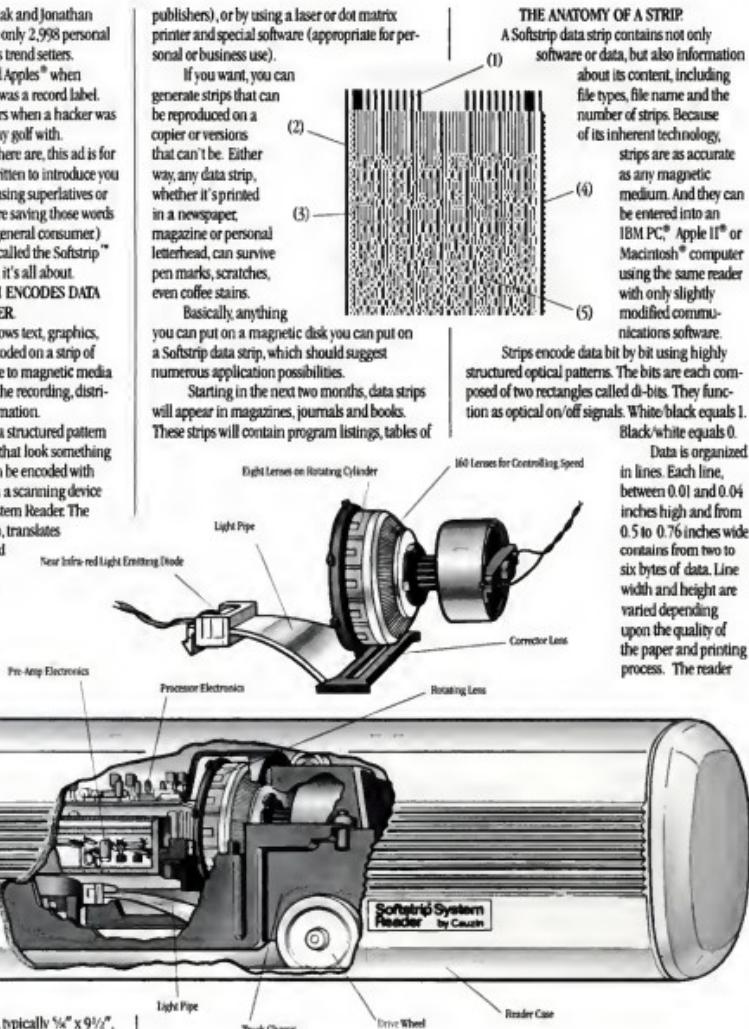
Starting in the next two months, data strips will appear in magazines, journals and books. These strips will contain program listings, tables of

**THE ANATOMY OF A STRIP.**  
A Softstrip data strip contains not only software or data, but also information about its content, including file types, file name and the number of strips. Because of its inherent technology,

strips are as accurate as any magnetic medium. And they can be entered into an IBM PC®, Apple II® or Macintosh® computer using the same reader with only slightly modified communications software.

Strips encode data bit by bit using highly structured optical patterns. The bits are each composed of two rectangles called di-bits. They function as optical on/off signals. White black equals 1. Black/white equals 0.

Data is organized in lines. Each line, between 0.01 and 0.04 inches high and from 0.5 to 0.76 inches wide, contains from two to six bytes of data. Line width and height are varied depending upon the quality of the paper and printing process. The reader



One Softstrip data strip, typically  $\frac{1}{4}$ " x  $9\frac{1}{2}$ ", can contain up to 5,500 bytes of information. (For example, you could fit this entire ad on two strips.)

Strips can be printed by using a photographic negative (ideal for book and magazine

contents, new product demonstrations and data. Eventually strips may be used for everything from bank statements to sheet music.

scans each data line with a series of raster scans 0.0025 inches apart providing between four and sixteen scans per line.

# who want to know about new become household words.

A close-up view of a strip reveals five distinct sections. The header (1) at the top tells the reader the number of bytes in a line, the height of each line, and the paper to ink contrast level. Running vertically down the sides of the strip are the starline (2), the checkerboard (3) and the rack (4). They identify the boundaries of every horizontal line to be read. They also work in tandem to feed the reader alignment information.

Contained within the body of the strip, between the checkerboard and rack, is the file's data area (5).

Strip data accuracy is checked and error correction is provided by parity bits at the beginning and end of every data line, as well as by a strip checksum. There is also an optional 16 bit CRC. Combined, this design results in an undetected bit error rate of less than one bit error per 10,000,000,000 bits.

## IT TOOK GUTS TO BUILD THE READER.

Rated for 25,000 reads, the reader is an equally impressive technology. It's composed of two key components: the case and the truck. While the case sits still, the truck moves uniformly down the length of the strip making a complete scan of the strip's bit lines every 0.0025 inches.

As the truck moves down the strip, it tracks its own lateral movement within five microns. Alignment is controlled by two servo mechanisms. As the truck moves, it illuminates the area to be scanned using near infra-red light beamed through a light pipe. (The infra-red technique permits the reader to see through colors, stains, and spills.)

The reader's optical scanning system, containing eight rotating cylindrical lenses and an aspherical corrector lens, forms an F1.2 optical system with a depth of field between 0.05 and 0.08 inches. A set of 160 additional cylindrical lenses on the rotating lens allow the system to control scanning speed.

Inside the reader, the mechanical system uses six AGMA-7 high precision plastic molded gears to provide very accurate truck movement. One gear system even allows for a 4000 to 1 angle reduction with no backlash for correct lens alignment.

ATMS 7040 8-bit processor and Cauzin's own custom VLSI chip provide

reader logic, control and communications using four nested phase locked loops and several hardware and software servos. The reader transmits data to the host at 4800 baud burst rates with throughput of 1500 baud.

## HOW TO CREATE YOUR OWN STRIPS.

There are two ways to create Softstrip™ data strips. For large volume and greater density - up to 5500 bytes per strip - a film negative is created using special Cauzin software and hardware. This is ideal for book, magazine, newsletter, data base and commercial software publishers who can reproduce a strip in volume using web, offset, gravure or similar processes.

For personal or business applications, 500 to 1000 byte strips can be

generated using Cauzin licensed software on dot matrix printers; up to 3400 byte strips can be generated using other Cauzin licensed software and laser printers.

In the next few months, you should start to see data strips appear in popular computer magazines, some new computer books, and those

John G. Porter and Howard D. Reiner  
**BASIC Business Subroutines**

by John G. Porter and Howard D. Reiner

© 1982 Cauzin Systems, Inc.

Softstrip™ is a trademark of Cauzin Systems, Inc.

Apple® and Macintosh® are registered trademarks of Apple Computer Inc.

Apple® is a registered trademark of Apple Research, Inc.

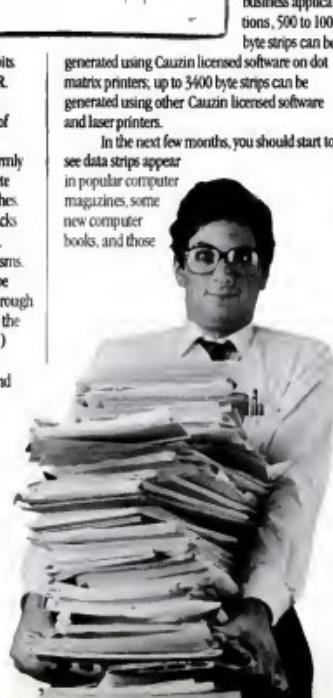
Software® and the Software®

System Reader are trademarks

of Cauzin Systems, Inc.

consumer ads we told you about earlier. They'll look exactly like the working strip you see here, a medium density strip with an ASCII text file on it.

Of course you'll be able to purchase a reader at most computer dealers. They'll be selling for about \$300.00. Contact your dealer soon for a demonstration. Or call us directly at 203-573-0150.



Softstrip

**Softstrip**  
COMPUTER READABLE PRINT

Cauzin Systems, Inc.,  
835 South Main St., Waterbury, CT 06706  
CIRCLE 330 ON READER SERVICE CARD

# The ONE and ONLY \$50 Complete Accounting System

17 NEW Features Make 118 Reasons To Buy MCBS Accounting Software!

## General Features

- 1) New automated start-up and installation procedure minimizes use of DOS commands.
- 2) For fixed disk, creates subdirectory and copies all files to disk.
- 3) Manual printing has been greatly simplified.
- 4) Menu Driven System
- 5) Integrated or Stand Alone
- 6) Simplified Installation
- 7) Complete Audit Trials
- 8) Data Files can be accessed by Lotus, dBase, etc.
- 9) Reports on diskettes, print them on your printer.
- 10) Modules can be purchased separately.
- 11) Accounts and transactions limited only by disk space.

## General Ledger

- 12) Improved budget reporting module.
- 13) Integrated integration with other modules including Payroll.
- 14) Supports multiple departments
- 15) Flexible chart of accounts
- 16) Prints financial statements in flexible, user defined formats.
- 17) Prints Income Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
- 18) Prints Departmental Income
- 19) Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
- 20) Prints Budget Comparison
- 21) Income Statement and Balance Sheet comparing Actual vs. Budget with variances and ratios.
- 31) Prints Trial Balance and Chart of Accounts
- 33) Prior Period Adjusting Entries do not impact current results.
- 34) Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
- 35) System allows new accounts to be created during data entry.

## Accounts Payable

- 36) Vendors may be added to system during the entry of invoices.
- 37) Standardized selection of vendors and invoices for payment.
- 38) Provides for entry, updating and deletion of vendor information.
- 39) Allows entry, editing and posting of payables, adjustments, cancellations and prepayments.
- 41) Prints the Open Item P/Cash
- 42) Requirements reports.
- 43) Allows partial payments.
- 44) Prints A/P checks.
- 45) Prints Check register.
- 46) Prints the A/P distributions to the General Ledger
- 47) Prints the vendor analysis report.
- 48) Interfaces to MCBS' General Ledger or may stand alone.

## Accounts Receivable

- 49) Customize your own headings on Invoices and Credit Memos. No programming required.
- 50) Add finance charges at the rate you choose to accounts you wish to charge.
- 51) Provides for entry, updating and deletion of customer information.

## Accounts Receivable Cont.

- 52) Allows entry, editing and posting of receivables, credit memos, cash payments.
- 53) Allows up to 99 repetitive line items for fast invoicing.
- 54) Prints the open item and aged receivables reports.
- 55) Prints Invoices, Credit Memos
- 57) and Statements.
- 58) Prints Sales Analysis.
- 59) Supports Partial Payments
- 60) Prints invoice, Payment and Credit Memo Registers.
- 61) Interfaces to MCBS' General Ledger or may stand alone.

## Payroll with State & Local Taxes

- 62) Now integrates with General Ledger.
- 63) New prints 1985 W-2 and 1099-MISC forms.
- 64) Provides for entry, updating and deletion of employee information.
- 65) Handles hourly, salaried or commissioned employees on weekly, bi-weekly, semi-monthly or monthly pay periods.
- 66) Calculates Federal, State and Local Taxes.
- 69) Allows user to maintain all tax tables.
- 70) Maintains payroll history.
- 71) Calculates the payroll.
- 72) Prints the payroll register, check register and deductions register.
- 73) Prints payroll checks.
- 74) Provides for after-the-fact payroll.
- 75) Prints W-2's, 1099's, 941's and quarterly earnings reports.

## Inventory

- with Order Entry & Purchase Orders
- 79- Add Customers, Vendors or Items without leaving the entry screen you are working with.
  - 82) Reports allow selection by department or total.
  - 83) WILD CARD customer feature allows creation of walk-in customer account for Point of Sale invoicing.
  - 84) WILD CARD item allows for billing miscellaneous, non-inventory charges.
  - 85) Uses Average Cost.
  - 86) Provides for inventory item entry, updating and deletion.
  - 87) Provides for order entry and editing with inventory update during entry.
  - 88) Stock and non-stock items.
  - 89) Handles purchases, returns, shipments and adjustments.
  - 90) Prints invoices, credit memos, picking tickets, purchase orders, price lists and shipping labels.\*\*
  - 91) Prints on preprinted forms or plain paper.
  - 92) Prints stock status report and purchasing advice reports.
  - 93) Full back order retention.
  - 94) Quarterly, yearly and prior year inventory history.
  - 95) Performs book to physical analysis.
  - 96) Over 20 management reports.
  - 116) Including extensive Sales Analyses and Loss Sales Report.
  - 117- Interfaces to MCBS' General Ledger, A/R, A/P or may stand alone.
  - 118) Requires A/R & A/P for some functions.

\*\*Requires A/R & A/P for some functions.

TO ORDER CALL:  
**1-800-FOR MCBS**  
1-800-367-6227

Any Module For \$15 ea.  
Or All 5 For \$50 Total  
For More Information  
Call (713) 444-6269

— UNCONDITIONAL —  
MONEY BACK GUARANTEE

Service Contract:  
Up to 10 telephone calls for \$50 yr.  
Shipping Charges \$5.00  
Texas Resident add 6% Tax  
COD Charges \$5.00  
Payment by Check, MC or VISA

All programs run on IBM, IPC/XT/ATL/ATP, EPSON, TANDY 1000/1200/2000, TI/WANG, COMPAGNIA CORONA, SAMYO, COLUMBIA\*, and most other MS-DOS machines.

Requires 128K Ram, 2 Floppies or Fixed Disk, 80 Column Printer, MS-DOS, PC-DOS 2.0 or later.

\*Computer & software names are trademark or registered by their respective manufacturers.

## Client Accounting Software

This system is for people doing accounting work for other people. This is version 4.0, a new release. Call or Write for more details.

**Client Accounting System** **\$150**  
(Does not include 5 module system)

Micro Computer Business Services			
12703 Suburban Airline Houston, TX 77014			
Complete Package - G/L, A/P, A/R, P/R, INV Individual Module - G/L <input type="checkbox"/> A/P/C/A/R/D/P/R/INV Accountants' Client Write-up System		CITY _____ CITY _____ CITY _____ Texas Residents Add 6% = _____ Shipping Charges = _____ H COD add 5% = _____ TOTAL = _____	
Pay Method Prepaid, Check Enclosed _____ MC. # _____ VISA # _____ Expires _____ Signature _____		Phone _____ Contact _____ State _____ Zip _____	
Company Name _____ Street / Number _____ City _____			



ed. Using the "kit pull" screen, you can enter the assembly you need to build and the quantity required. The system will then calculate how much inventory is needed. It will also warn you when there isn't enough inventory in stock. The screen prompts you to select a different site, ignore the shortage, or use a substitute part.

There are only a few bill-of-materials reports, but they give you most of the information you need to control your parts inventory. They include a costed bill of materials for each assembly through a total of up to 23 levels, an indented parts list, and a trial kit pull that generates assembly requirements and limits without changing quantities. Most of these reports can be printed one assembly at a time or for the entire inventory. Also, the system will display a "where used" list that shows the assemblies in which each item is used.

This bill of materials processor represents the most dramatic difference between *The Business Library* and comparable accounting packages. It's a capability most often seen only in specialized manufacturing software and could be quite useful if you need to track inventory quantities and costs in a light manufacturing operation.

**ORDER ENTRY** The Sales Order Entry module was written for companies that need to enter orders, create picking lists for warehouse order selectors, and then ship the goods selected by warehouse personnel. You can enter cash sales, but we don't believe this module would function all that well as a point-of-sale system. The billing process requires you to use multiple screens for charge sales, and you cannot print invoices from cash sales. However, as an order entry system for a distributor or manufacturer, the Sales Order Entry module performs quite well.

You can create a tax code file that contains a code, a description of the taxing agency, the tax percentage, and the general ledger account to which the tax data should be posted. The system will maintain a record of sales by tax code for reporting purposes.

There are two optional master files that can speed the process of billing customers. You can set up multiple shipping addresses for each customer. From the order entry

# COPY II PC OPTION BOARD

**At last,** an almost foolproof method of making archival backups of protected software! The Copy II PC Option Board is an add-in board that will give your PC the same disk duplication technology used by most disk duplication firms (who put the copy protection on software in the first place!).

## DUPLICATES NEARLY ALL\* PROTECTED DISKETTES!

The Option Board can easily backup almost all protected diskettes for the IBM PC, including ones software-only backup programs can't touch! It even includes a track editor that will allow the more technically inclined to look at protection schemes and edit any data on a diskette.

The Option Board uses a full size slot in an IBM PC, XT, or AT (with at least 1 360KB floppy disk drive). Compaq Deskpro, Compaq Portable requires an extra \$15 cable.

**CENTRAL POINT  
Software, Inc.**

9700 SW Capitol Hwy. #100  
Portland, OR 97219

**503/244-5782**

M-F 8-5:30, W. Coast Time

CHECK, COD WELCOME  
(Prepayment Required)

**\$95.00**

plus \$3 s/h (\$12 outside U.S.)

\*Except those "protected" by physical disk damage.

**Now Available!** Put all the most popular **disk utilities** (even undelete) together with a powerful DOS interface. Then make them **resident** and what do you have?? **PC TOOLS!** PC Tools lets you run nearly any DOS command *within any other running program*.

**JUST \$39.95 plus s/h.**

CIRCLE 188 ON READER SERVICE CARD

## Operate your office PC from home ...



Use the power of your office-bound PC at home or on the road ... all you need is REMOTE.

Whatever PC power you may need, spreadsheet, DBMS, word processor, can be yours. All you need is a portable computer or terminal and a modem. REMOTE provides password protection for each user.

Leave your PC in the office ... but pack the power to go. REMOTE.

**REMOTE**™

**MICROSTUF®**

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

# SWISS QUALITY

YOU CAN AFFORD

## Compact Lightweight



**PaperPro™**

**Low-cost  
Feeder**

FGH85PP

**Ruttishausen**

Ruttishausen of America Incorporated

10345 Brockwood Rd. • Dallas, TX 75238

Telephone (214) 343-9154

CIRCLE 153 ON READER SERVICE CARD

## ■ THE BUSINESS LIBRARY

screen, you can cycle through this list of addresses and choose the one you want. The discount/price screen gives you two methods of pricing the items that you sell. If you choose the discount method, you can set up a tiered discount schedule that you can apply to a price at order entry time. Each discount (up to four are allowed) is applied after the previous one has been applied. Although one discount percentage is common to most packages, many business situations require the use of a tiered discount schedule (10 percent, 5 percent, 2 percent, for example). This is one of the few packages we've seen that can handle these kinds of tiered discounts. The second method, the pricing method, allows you to set up ten prices in a schedule for each item. When entering orders, you can use either the price code that you assigned to a customer or one of the other nine codes assigned in the price schedule.

You can enter two kinds of orders into the system: charge sales and cash sales. No provision is made for standing orders (orders that can be invoked many times). The charge sales entry screen is divided into a header screen and a detail screen. Once you accept the header information, the system prompts you for each detail line of the order, including item number, quantity, site, tax code, discount code, and price. The cash-sales entry screen follows much the same pattern. However, as you would expect, this screen requires less header information.

Once you have entered your orders, you can generate picking lists to be used to select merchandise for shipping. Confirmation of the items being shipped (billing information, in effect) can then be entered. This function works smoothly, calculating back orders immediately. When you finish entering the shipments, you can create packing slips for all the shipments entered. Invoices for each customer shipment are not created automatically—you must initiate the production of invoices. You can invoice customers for all shipments made on or before a certain date or you can select only certain customers to bill.

One of the most useful reports produced by the order entry module is the backlog/back order report, which you can print out by customer, by day, and by item number and site. The system also lists lost

sales by item number so that you can tell if back orders for a given item are costing you sales. In addition, you can print gross sales for the last 13 periods, gross profit by item for sales this month, and sales for customers with activity above a user-specified dollar level.

**GENERAL LEDGER** The General Ledger module is a solid basis for financial reporting, although it is not the strongest module in *The Business Library*. An "nnnn-nn-n" account structure is used: the first four digits are the prime (or natu-

ral) account, the next two digits are the subaccount, and the last two digits allow you to code and report by cost center or department. You can specify that you have either 12 or 13 accounting periods, a feature that is not found in every package and is useful for companies that want to use 13 4-week accounting periods (as a retail enterprise might) or for audit adjustments that you don't want mixed in with the 12th-period transactions.

The chart-of-accounts entry screen allows you to enter the account, description, account type, current and previous-year opening balances, and periodic budget information. The screen also displays your current year's and prior year's activity.

Before you post journal entries, you must establish the various standard journal "types" (such as sales or cash) that will be used to segregate transaction batches as you post them. You can also set up recurring journal entries that can be posted as is appropriate each period. One word of caution, however, is that the system does not warn you that you may be posting the same

**3M**  
diskettes

recurring journal entry twice in the same month, so you should carefully monitor the use of recurring entries.

The journal entry screen is very straightforward and allows you to enter transactions quickly. Batch numbers are established as a combination of the journal type and an assigned sequential number. These are assigned automatically as you enter transactions and help you control the accounting process. Once you complete a batch, the program immediately posts the transactions to the General Ledger—miraculously, without any hard copy batch edit report. This approach departs significantly from the standard procedure found in most other packages (enter transactions, print a journal, and post) and speeds the entry/posting process. On the negative side, such a system could make correcting mistakes difficult.

The General Ledger module comes with five built-in reports that help you prepare your financial statements. You can print a detailed trial balance (which prints all the transaction detail for the month), a summary trial balance (which summarizes the monthly detail by account), journal and batch activity reports of transactions entered, year-to-date detail activity for each account, and a summary chart of accounts.

You can also create tailored financial statements using *The Business Library's* custom report formatter. You'll have to invest some time in learning how to code reports, since, as always, sophistication breeds complexity. However, the effort should reward you, as the formatter gives you plenty of flexibility in setting up custom column and line formats. You can specify up to six columns of data per report format and up to 17 subtotal levels. In addition, you can create subsidiary schedules within a report to calculate certain lines on your financial statements. One very handy feature of the report printing program allows you to specify a single report format for use in reporting the results of many different cost centers.

You can consolidate multiple companies that you have established using *The Business Library's* General Ledger module. In order to do this, you set up a master company, and the system takes transactions from the companies that you specify and posts them to that company's ledger.

For more information on *The Business Library*, call or write:

1050 E. MAPLE RD. • TROY, MI 48083

(313) 599-3440

CIRCLE 267 ON READER SERVICE CARD

PC MAGAZINE ■ FEBRUARY 11, 1986

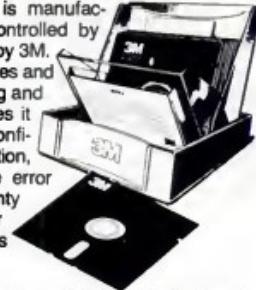
199

Everything that goes into a

3M diskette is manufactured and/or controlled by specifications set by 3M.

From unique substrates and oxides, to hole punching and jacket fabrication, 3M does it all and does it well. With confidence in your complete satisfaction,

3M diskettes are certified to be error free and have an unlimited warranty against defects in workmanship or materials. Day in and day out 3M gives you one less thing to worry about.



What separates us from our competition? Simply a combination of the best service in the industry, highly competitive pricing, and an ever widening range of products. Above all we care about our reputation and we are willing to work on a lower margin while delivering what others only claim—and we do it all on a day-in day-out basis.

Early in 1986 every subscriber to PC Magazine will receive our New 1986 First Edition Catalog with 16 additional pages and dramatically lower pricing. We want to be your source for computer supplies & accessories.

## Lyben Computer Systems

WATCH  
FOR  
OUR  
NEW 1986  
CATALOG

1050 E. MAPLE RD. • TROY, MI 48083  
(313) 599-3440

CIRCLE 267 ON READER SERVICE CARD

## PC power ... anywhere.



REMOTE lets you use all of your PC software from the other end of a telephone line . . . wherever that might be!

All you need is a terminal or portable microcomputer, a modem, and a phone line. You can call into the host microcomputer, access it, and run most popular programs, including word processors, spreadsheets, and database managers. You'll see the program in operation just as if you were sitting in front of the host computer.

REMOTE's powerful electronic mail system rivals those found on mainframes, with full password protection. Why leave your PC power in the office . . . when you can give it a call with REMOTE?

# REMOTE

MICROSTUF<sup>TM</sup>

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

PC MAGAZINE ■ FEBRUARY 11, 1986

199

## ■ THE BUSINESS LIBRARY

**ACCOUNTS PAYABLE** The Accounts Payable module offers much the same flexibility as the Accounts Receivable module. The vendor file maintains a full complement of vendor-related informa-

tion, including up to seven characters for the vendor code, as well as the address, phone number, contact, classification (for sorting vendor lists), vendor rating, and period and year-to-date purchases. The

package also allows you to enter recurring invoices that you can post into the system as transactions at any time during the month.

The invoice entry screen is fast and simple, as is the rest of *The Business Library*. You enter the vendor code, invoice number, discount percentage, invoice amount and date, due dates, and discount dates into it. However, the module does not store the terms for each vendor in the vendor master file, so you must calculate your own due dates and discount dates. We found this to be a bit of a letdown in an otherwise capable system.

Once you enter the header information, you then enter the invoice's general ledger distribution. Contrary to the high degree of integration found in other *Business Library* modules, you must exit this program and go into another one in order to produce the invoice journal and post transactions.

The software has five different ways you can select invoices for payment. You can select all open invoices, all those due in a specific date range, all those eligible for discount, all open items for a vendor, or only certain specified invoices. In addition, you can make partial payments, cancel payments, and hold or release an invoice for payment. Once you've selected your invoices, you can print checks.

Some systems make it difficult to process manual checks, but *The Business Library* makes it quite easy. You simply enter the vendor, check number, date, and amount. Once you apply your check to the invoices that you paid, you can print a list of the manual checks and post them with the same program that posts automated checks. The Accounts Payable module also has a check reconciliation screen that allows you to keep track of outstanding and void checks, a feature not found in many packages.

**OTHER MODULES** In addition to the Purchase Order Tracking and Payroll modules, *The Business Library* also contains a Business Analyzer, an Information Retrieval module, and a Time Accounting and Project Tracking package. The Business Analyzer module allows you to generate most of the common financial ratios from data that you enter (say, industry averages) compared to and combined from

# DISCOVER THE LANGUAGE OF ARTIFICIAL INTELLIGENCE PROLOG V

Interpreter for MS-DOS/PC-DOS

At last! A Prolog with enough muscle to handle real-world applications for UNDER \$100! Discover why Japan has chosen Prolog as the vehicle for their "Fifth Generation Machine" project to design intelligent computers.

CHOOSE FROM TWO GREAT VERSIONS:

**PROLOG V-Plus** **PROLOG V**  
\$99.95                    \$69.95

- More than 100 Predicated Predicates
- Large Memory Model (to 64K)
- Floating Point Arithmetic
- 150+ Page User's Manual and Tutorial plus Advanced Programming Documentation
- Co-Resident Program Editor
- Calls to Co-Resident Programs
- Text and Graphic Screen Manipulation

### STANDARD FEATURES ON BOTH:

- Cocke & Mellish Standard Edinburgh Syntax
- Extensive Interactive Debugging Facilities

### THE CHOICE OF UNIVERSITIES

Generous university site licenses and an excellent teaching tutorial and reference guide have made PROLOG V the choice of universities nationwide. Call for details.



- FREE FREE FREE FREE FREE  
Programming in Prolog  
by Coxwell & Mellish, \$17.95  
Available with PROLOG V  
Plus or Co-Resident Version  
Master 5.25" disks

Upgrade  
to PROLOG V-Plus  
for only the difference  
in price plus a  
handling charge

NO RISK OFFER  
Buy PROLOG V-Plus  
within 30 days of purchase  
and our risk for 30 days if  
not fully satisfied. Return  
with disk still sealed for  
full refund

### PHONE ORDERS: 1-800-621-0852 EXT 468

<input type="checkbox"/> PAYMENT ENCLOSED	\$	CA residents add 6% sales tax
<input type="checkbox"/> CHANGE MY	<input type="checkbox"/> MasterCard	<input type="checkbox"/> Visa
Card No	Exp Date	SIGNATURE
Mr./Mrs./Ms.	please print full name:	
Address		
City/State/Zip	C.O.D. Orders Not Accepted 15 day check clearance	



CHALCEDONY  
SOFTWARE

5880 LA JOLLA BLVD  
SUITE 126  
SAN DIEGO, CA  
92037  
(619) 483-8513

CIRCLE 219 ON READER SERVICE CARD

data found in your general ledger. The Information Retrieval module allows you to extract information from most of *The Business Library* modules and put it into a fixed-length ASCII file you can then import into a spreadsheet or database for further manipulation. The Time Accounting and Project Tracking module interfaces with the Accounts Receivable and Payroll modules in order to assist professional firms in accounting for fees and expenses associated with client work.

**DOCUMENTATION** *The Business Library* manuals are polished and complete. They contain pictures and explanations of all the available screens and reports and describe the meaning of each and every system prompt. An appendix that describes backup procedures and possible system errors is also included.

The manuals could benefit from a more thorough overview of the entire system that explains how all the different modules and master file codes tie together. In setting up the modules, there were times when it wasn't clear to us until we switched to a different module why we needed to establish a given code or how it would be used. There is a lot to understand in such a powerful system; the user needs and deserves a few pages to do its capabilities justice.

**CONCLUSION** Installing *The Business Library* may be a challenge for anyone who has never used a PC or has never installed or used an automated accounting package. The software is best suited for those who have some accounting training and who understand how transactions flow through the various accounting processes. You may need your trusty accountant or computer consultant standing by during installation to help you understand all the interconnections and relationships between the modules.

*The Business Library* is a powerful set of integrated application packages with an impressive list of features. If you are willing to persevere and engage in some upfront planning, however, it may be worth your while to get yourself a library card and check this program out.

—Mike Falkner, Pat Fitzhenry, and G. William Dauphinais

## THE BEST OF BOTH WORLDS.

### 286 \* TURBOSWITCH.

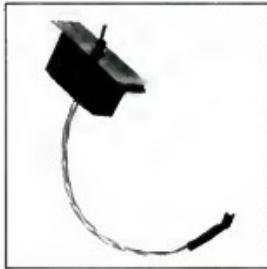
You want productivity. But you have worried about compatibility. Now your IBM PC AT can have both.

With the 286 \* TURBOSWITCH from Megahertz, 8 MHz processing speed is yours for the asking. And 6 MHz (it's the standard speed) too.

When you think of it, who wants to take apart a computer just because every little thing doesn't work at 8 MHz? Not us.

With some computer peripherals, you have to be a technician to install the enhancement. With the 286 \* TURBOSWITCH, you are qualified to install it if you can operate a lightswitch.

There are reasons for getting a 286 \* TURBOSWITCH: buy one if you are interested in speed, compatibility, and quality.



## MHz MEGAHERTZ CORPORATION WE HAVE THE TECHNOLOGY

Call us or your dealer. Or write.  
Your time is too valuable to waste.

50 South Main, Suite 600  
Salt Lake City, Utah 84144  
(801) 355-8857

CIRCLE 389 ON READER SERVICE CARD

## System service by REMOTE control.



System troubleshooting's enough of a headache without adding travel to it. REMOTE can cut your service travel ... to nothing flat.

REMOTE lets you access and operate a distant system via modem. You can troubleshoot the system from top to bottom, update or revise software and data files ... all without leaving your office!

Boost your system support efficiency and your bottom line ... all you need is REMOTE!

# REMOTE™

**MICROSTUF®**

1000 Holcomb Woods Parkway / Roswell, Georgia 30076  
CIRCLE 214 ON READER SERVICE CARD

# The Right Stuff! from Multitech

Multitech Unveils  
Power and Economy  
In Two New Computer Packages

## Start with the entry-level, versatile POPULAR 500.

This personal computer gives you IBM compatibility in an affordable, revolutionary package!

### The POPULAR 500:

- runs programs written for the IBM personal computer
- provides up to 512 Kbytes of memory on the system board for use with the most powerful software
- has four slots for system expansion boards
- accommodates two diskette drives and a variety of IBM compatible keyboards

The system comes standard with:

- MS-DOS 2.11
- 256 Kbytes of User Memory
- Real Time Clock
- Parallel; Serial; and Game Ports
- A 360 Kbyte diskette drive and AT-style keyboard
- Video Monitor Adapter



## SHIFT INTO HIGH SPEED 8 MHZ MODE FOR PERFORMANCE PLUS!

The PLUS 700 is an IBM compatible personal computer that provides more for the business user than ever before.

### The PLUS 700:

- runs your programs up to 60% faster than the IBM PC
- provides up to 640 Kbytes of user memory right on the system board

The PLUS 700 comes standard with:

- 256 Kbytes User Memory
- Parallel and Serial Ports
- 2 1/4 ht diskette drives, 720 Kbytes total
- MS-DOS 2.11
- CONCURRENT CP/M

Multitech also provides a full line of IBM compatible expansion cards to meet your special needs.

**MULTITECH - A leading manufacturer in the computer age.**

IBM and IBM PC are trademarks of International Business Machines Corporation.  
DEALER and OEM INQUIRIES WELCOME



**Multitech**  
ELECTRONICS INC.

Committed to Excellence, Quality and Service

CALL TOLL FREE (800) 538-1842  
In California, CALL (408) 773-8400  
1012 STEWART DRIVE SUNNYVALE, CA., 94088

# LAN *Power*

FOR COST EFFECTIVE KNOWLEDGE MANAGEMENT.

If you're thinking about standardizing the computer systems in your office... and cost is important... you'll want to know about LAN power, available from **mdbs** today.



Let MDBS III add real power to your local area network. These features give you productivity like you've never had before:

- Recovery and transaction logging
- Locking of individual records, not just files
- Formalized report writing
- Debugging aids for the application developer
- Many possible programming languages
- SQL-like query language
- Screen management tools
- Multiple data structure support, including network, hierarchical and relational
- Unsurpassed speed

MDBS III is an unrivaled powerhouse for your LAN. Available for networks from Novell, IBM, Nstar Systems and 3Com under PC DOS and from 3Com for Texas Instruments.

For more information on MDBS III, call or write Micro Data Base Systems, Inc./Application Development Products, 1834 Walden Office Square, Suite #250, Schaumburg, IL 60195, 800-323-3629; Canadian and Illinois residents, 312-303-6300.



Get everyone in your office in on the universal knowledge management system, KnowledgeMan/2.

From data management to spreadsheet to statistical analysis, KnowledgeMan/2 is ready. Share your resources, consolidate your applications, programs, utilities and data with the most advanced integration available. KnowledgeMan/2's LAN form allows several users to share a data base and still protect data integrity.

Help your office become more efficient and productive. KnowledgeMan/2 turns your local area network into a productivity powerhouse. LAN distributes it.

KnowledgeMan/2 is available for networks made by Novell, 3Com and IBM.

Get the power of your LAN with MDBS III, KnowledgeMan/2 or both. MDBS III and KnowledgeMan/2 can even be used together, for phenomenal application development power.

For more information on KnowledgeMan/2, call or write Micro Data Base Systems, Inc./Marketing & Sales, P.O. Box 248, Lafayette, IN 47902, 317/463-2581.

CIRCLE 109 ON READER SERVICE CARD



# Meet The Princeton Graphic Systems Family.

**The right monitor at the right price.** Princeton Graphic Systems offers you a complete family of high performance personal computer monitors. Monitors that deliver the compatibility, resolution, and reliability you need for any application and any budget: from word processing to sophisticated business graphics.



**HX-12.** High resolution RGB monitor - 640 x 200 lines noninterlaced - .31 mm dot pitch tube-Nonglare screen - \$695

**HX-12E.** High resolution RGB monitor 640x350 lines noninterlaced - .28 mm dot pitch - Compatible with IBM Enhanced Graphics Adapter - Nonglare screen - \$785



**MAX-12.** Amber monochrome - 720 x 350 lines - Enhanced Interface with IBM color or monochrome adapter card - Nonglare screen - Can display 16 shades of amber - \$249



**HX-9/9E.** Nine inch, high resolution RGB monitor non-interlaced - .28mm dot pitch tube - .9E compatible with IBM Enhanced Graphics Adapter - Nonglare screen - Green/Amber switch - Apple/IBM colors - Etched dark glass screen - \$650/\$750 (9E)



**SR-12P.** PGS's top of the line RGB monitor 640x480 lines noninterlaced - .26 mm dot pitch - Analog input allows for the display of 4,096 possible colors - Compatible with IBM Professional Graphics Adapter - Nonglare screen - \$999



**Princeton accessory product line.**  
Undergraduate tilt/swivel monitor base  
ColorView card, Green/Amber switch, RGB-80 card  
and Scan Doubler card.

## Princeton Graphic Systems. The only real choice.

For office or home use, Princeton Graphic Systems has a monitor that's right for you. Inquire at your local computer store about our complete line of high resolution color and monochrome monitors; monitors that live up to the Princeton Graphic Systems' tradition of quality, performance, and value. **Princeton Graphic Systems**, 601 Ewing Street, Bldg. A, Princeton, N.J. 08540. (609) 683-1660 Telex: 821402PGSPRIN (800) 221-1490. Ext. 302

**PRINCETON™**

GRAPHIC SYSTEMS  
AN INTELLIGENT SYSTEMS COMPANY

CIRCLE 224 ON READER SERVICE CARD

IBM Enhanced Graphics Adapter and IBM Professional Graphics Adapter are trademarks of International Business Machines, Inc. ColorView is a trademark of Computer Color Corp. ColorView is a trademark of Colorus Data Systems, Inc. Apple is a trademark of Apple Computer Corp. PC is a trademark of IBM Communications Inc. SA-12 series courtesy of Mouse Systems Inc.

# HARNESSING THE LASER PRINTER

*A gaggle of utility programs is now available to make your old word processor work with your new laser printer—Microsoft Word no longer has the field all to itself.*

**I**s there a PC user alive who hasn't lusted after a laser printer? By now, all of us have marveled at the superb typesetlike text we've received in letters, seen in ads, or studied in the legion of laser-printed documentation. The mixture of magnificent type fonts, bold headings, and proportional spacing combine with the speed and dead silence of the Hewlett-Packard LaserJet line, Canon, BDS, and the other laser printers emerging now to form an unbeatable amalgam of quality and performance.

All this has its price, of course. Besides the obvious cost of purchasing a laser printer, compatibility with the word processor you use is a major issue. Until recently, only the newest generation of PC word processor included provisions for driving the lasers. The cost of buying a new word processor isn't that great, but the

cost of retraining legions of WordStar users is tremendous. And what about the countless millions of words locked into the file formats of WordStar and other venerable text processing programs.

Worry not, faithful MicroPro addict. Help is at hand, in the form of programs that allow WordStar and other word processors to extract the full benefit from laser printers. The programs reviewed here bring the unruly laser beast to heel. Several are designed specifically for word processors that can't normally drive a laser printer. I've also looked at some utilities that work laser magic with any software and even one that takes the already powerful laser control of Microsoft Word, Version 2.0, a significant step further.

## ■ LASER UTILITIES

**POLARIS'S PRINTMERGE** WordStar is not totally ignorant of the laser printer. MicroPro has released a limited WordStar driver for the HP Laserjet, but it can currently use only the HP's internal Courier

fonts and is otherwise quite limited.

Polaris Software fills the vacuum by adding full Laserjet control to WordStar with its *PrintMerge* utility. *PrintMerge* is a standalone program that you use to print

documents instead of using the print functions built into *WordStar* itself. It incorporates a series of new dot commands and control sequence commands that you insert in the document in place of normal MicroPro commands. A large number of commands must usually be entered to set up the printer, font cartridge, margins and the like, but these can be stored in a small file and merged into your document when you need it.

Most of *PrintMerge*'s dot commands function identically or at least similarly to the normal *WordStar* commands. However, the command for right justification complicates matters somewhat. While

# THE ONLY AFFORDABLE HIGH PERFORMANCE STREAMING TAPE BACKUP \$895



Also available using a NEW  
1/2 height  
internal drive

30 day  
money back  
guarantee

IBM  
PC/XT/AT  
compatible

- Complete . . .  
• 60mb tapedrive  
• Controller  
• Cables  
• Software  
• Manual

Easy to understand menu driven software simplifies the backup operation, yet gives you a complete array of backup and restore options.

Backs up 20mb in less than 5 minutes on standard 3M cartridges.

The system uses the Archive high performance streaming tape drive which has backed up over a quarter million mini and super micro computers to backup your IBM PC/XT/AT or compatible disk.

# LINTEC

Affordable performance

Tel: (408) 370-7400

P.O. Box 2381, Saratoga, CA 95070

LINTEC, IBM PC/XT/AT and ARCHIVE are registered trademarks of LINTEC, International Business Machines and Archive Corp. respectively.

CIRCLE 506 ON READER SERVICE CARD

- Polaris Software adds full Laserjet control to WordStar with its *PrintMerge* utility.

*WordStar* has never had a true proportional printing function (at least officially). *PrintMerge* can right-justify even proportional Laserjet fonts. Special commands are used to specify line length and enable paragraph formatting. The only other major wrinkle is that you may have to enter a special command to justify the last line when a manual page break has been specified.

Special commands unique to the Laserjet allow you to change fonts within a document (as many changes as desired), feed paper manually (useful for printing enve-



## FACT FILE

### *PrintMerge*

Polaris Software  
310 Via Vena Cruz, #205  
San Marcos, CA 92069  
(619) 471-0922

List Price: \$99 for copy-protected version;  
\$124 for non-copy-protected version  
Requires: 256K RAM, Hewlett-Packard  
Laserjet.

CIRCLE 622 ON READER SERVICE CARD

lopes), select paper size, print multiple copies, and so on. It uses *PrintMerge* instead of MicroPro's *MailMerge* utility; you have access to a full spectrum of standard commands (including the new conditional commands).

*PrintMerge* adds some useful functions

- Most of *PrintMerge*'s dot commands function identically or similarly to WordStar commands.

not normally available with *WordStar*. For example, *PrintMerge* can create variable width horizontal lines, vertical lines, and boxes. It can also include charts created with *Microsoft Chart*. You specify size and page position settings while creating the graphics in *Chart*. This is not the most flexible mechanism—a lot of experimentation and bouncing back and forth between *WordStar*, *Chart*, and *PrintMerge* will probably be necessary. The limited buffer in the standard LaserJet restricts the size of lines, boxes, and charts, but these new functions are potentially useful nonetheless.

*PrintMerge* can handle multicolumn printing, but the mechanism is rather cumbersome. It's not as bad as the terrible machinations necessary to print columns in *WordStar* itself, but it isn't nearly as flexible and easy as the multicolumn printing available in competitive word processors.

On a more positive note, *PrintMerge* adds an absolutely terrific feature known as Keyboard Translation Tables, which allow you to print the extended characters in the LaserJet's Roman 8 set. An otherwise unused character can be assigned to one of the characters in the extended set. Ten such tables can be defined. This is by far the easiest and most flexible method I have seen to access the characters needed for international correspondence.

*PrintMerge*'s documentation (which is obviously printed with a LaserJet) is rea-

sonably good. It is clear enough for an experienced *WordStar* user but probably not easy enough for a beginner.

The copy-protected version of *PrintMerge* sells for \$99, an unprotected ver-

sion can be obtained for an additional \$25 after sending in the registration form, an arrangement that seems like a reasonable compromise in these days of ever-more-annoying-copy-protection schemes.

## PathMinder™ from WESTLAKE DATA

### IS a DOS shell and more!

Introducing  
Version  
3.0  
with  
MORE  
Features  
MORE  
Versatility  
and  
LESS  
Hassle . . .



WANT MORE? . . . GET PathMinder™!

To order, call toll free (800) 628-2828 ext. 555 or contact:

**Westlake Data Corporation**



P.O. Box 1711, Austin, Texas 78767

**(512) 474-4666**



For the IBM PC, XT, AT, 3270 PC and all true compatibles.

CIRCLE 152 ON READER SERVICE CARD



## Unprotected Software Makes the Best of Friends

The Software Industry cannot afford this kind of friendship. Estimates show that companies like yours are losing half their sales to pirates. Imagine your software sales doubling this month!

### NEW

#### For Hard Disk Protection

- Fixed Disk Locker

#### For Disk Security

##### High Level Security

- PADLOCK II DISK
- SAFEGUARD DISKS
- COUPON DISKS

##### Low Level Security

- User Installable Protection
- PC-PADLOCK

Why should your valuable data or useful software program become available in the Public Domain?

Call or write for more information.



**GLENCO**  
**ENGINEERING INC.**  
3920 Ridge / Arlington Hts., IL 60004  
(312) 392-2492

CIRCLE 524 ON READER SERVICE CARD

## ■ LASER UTILITIES

*PrintMerge* works exactly as advertised—I had no problems with it after a brief learning period, during which I experimented with proportional spacing and the other new commands. The printed output completely matches that obtained using other word processors with the Laserjet, so *PrintMerge* clearly meets its design objectives.

The bottom line is you don't have to discard a faithful servant (and the tremen-

### ■ LaserPrint allows flexible and easy control over the use of Laserjet fonts.

dous investment in learning it)—you can still use *WordStar*, yet obtain the full benefit of the Laserjet all for only \$99! I strongly recommend it.

**BLAHA'S LASERPRINT** Blaha's *LaserPrint* is a utility to control the Hewlett-Packard Laserjet and Canon Laser Beam printers. It does not require use of a specific word processor because it works with any program capable of producing normal ASCII files. That includes spreadsheets and databases as well as word processors, which means you can create Laserjet multiple-font output with *1-2-3*, *dBASE III*, or anything you like.

You control *LaserPrint* commands by embedding dot commands in the file. You can put the commands anywhere on a line (they don't have to be on the left margin). To add underlining, for example, you type:

The .ULUnderlined.NUL word.

That command will look a bit strange to you if you're used to *WordStar*'s dot commands, but it quickly becomes comfortable.

Many of the *LaserPrint* commands merely issue standard HP commands to the Laserjet. Files of such commands can be used to configure the Laserjet for any printing job.

*LaserPrint* allows flexible and easy control over the use of Laserjet fonts. Fonts are specified with a dot command, provided that a "font file" has been prepared in advance for a given font. These files are nothing but simple text listings of a font's characteristics.

*LaserPrint* can also create raster graphics on the Laserjet. The program uses rows of asterisks to specify the dot patterns you want to use. While long rows may be necessary (depending on which dot density has been chosen), this method works very nicely for small patterns such as company or brand logos.

*LaserPrint*'s basic operation is straightforward. While it has no provisions for control of paragraph formatting, it is easy to achieve formatted output like that of *Microsoft Word*, *WordPerfect*, or other word processing programs capable of controlling the HP or Canon printers. *LaserPrint* is not as easy to use or as efficient as a word processor, however.

An enhanced version, *LaserPrint 2.0* adds more graphics capabilities to the basic package. This release can create graphic figures with commands like .LINE, .BOX, .REC, .SQUARE, .CIRCLE, .DISK, .ELLIPSE, and .OVAL. Each of these commands takes parameters specifying position, size, and, if appropriate, shading on a 12-tone scale.

The various *LaserPrint* commands work well, and it was easy to produce attractive output with several Laserjet font cartridges. The graphics commands created special effects that would have been difficult or impossible to produce with other programs. While advanced word processors are easier to use for run-of-the-mill



### FACT FILE

#### *LaserPrint*

Blaha Software  
991 Massachusetts Ave., #1  
Cambridge, MA 02138  
(617) 354-1999

List Price: Hewlett-Packard versions, \$99, \$199; Canon version, \$199  
Requires: 128K RAM, Hewlett-Packard Laserjet or Canon Laser Beam.  
CIRCLE 524 ON READER SERVICE CARD

**NEW! DS-CAPS**

**\$89.00\***

**A Unique Keyboard or Program Activated Data Switch for the IBM PC or Any MS-DOS System.**



DS-CAPS  
Data Switch



This compact self-powered switch is software controlled at the keyboard or program to direct parallel data from the computer to printers/plotters. Eliminates the time and frustration of recabling to use different peripherals. To install, connect between computer and peripherals, plug into power, boot supplied software disc and you are ready to code select and direct data flow between the two devices.

Also available is a complete line of manual and electronic switches plus converters to interface and direct data between CPUs and peripherals.

\*All units shipped freight collect. Add \$4.00 shipping for personal delivery services. VISA or MasterCard accepted. Quantity discounts available. AZ residents add 7%. Dealer inquiries invited.

**VIA WEST, Inc.**

The Interface Company

534 North Stone Ave., Tucson AZ 85705  
(602) 623-5716

Trademarks: IBM & IBM PC-International Business Machines Corp.; MS-DOS-Microsoft Corp.

CIRCLE 475 ON READER SERVICE CARD

# Free Catalog!

*Your 80-page guide to computer supplies and accessories—including complete new product descriptions.*



- Packed with over 1600 products for microcomputers, minicomputers, and word processors — many available nowhere else.
- Big special section devoted to new supplies and accessories.
- Comprehensive product descriptions — including more than 475 full-color photos — clearly explain features and benefits.
- Easy-to-use cross reference guides to magnetic media, ribbons, and more — along with the industry's most complete cable guide.
- Helpful suggestions and tips, ranging from flexible disk care to proper ribbon selection to useful application ideas.

Phone toll-free 1-800-547-5444

**inmac**

Phone toll-free 1-800-547-5444 or send coupon today.

Inmac Catalog Dept.  
2465 Augustine Drive  
Santa Clara, CA 95054

Please rush my free copy of  
the Inmac Catalog. I understand  
there is no obligation  
whatsoever.

NAM  
COMPANY  
ADDRESS  
CITY  
STATE ZIP PHONE

CIRCLE 227 ON READER SERVICE CARD  
PC MAGAZINE ■ FEBRUARY 11, 1986  
209

## ■ LASER UTILITIES

SIC program to control the laser printers (the Canon's command sequences are reasonably tough, and the HP's are a bear to use). Fortunately, that isn't all *PWL* does. It offers some really clever features that go well beyond the sophistication built into the laser printers.

For example, *PWL* includes a character set for the upper 128 positions of the ASCII code that emulates the IBM PC's standard character set—even if the characters aren't in a font cartridge. The generated characters aren't particularly good looking, but they work well enough to allow screen dumps that have real boxes and other IBM text graphics characters. *PWL* also adds emulation of the Epson MX-80, so that you can print Epson-compatible graphics (such as graphics screen dumps) and special graphics typefaces like those provided by SoftStyle's *PrintWorks* for dot matrix printers.

*PWL* includes a rather primitive "Memo processor" for quick notes or envelopes that can be printed immediately. *PWL* can also be disabled and printer output redirected to some other port, a feature that allows use of other printers as well as the laser printer. On-screen graphics images can be saved to disk and then resized and positioned on a page and printed. Printer output can be reduced by 33 or 66 percent or enlarged by 33 percent.

*PWL* includes provisions for the new HP LaserJet+. Up to six fonts can be downloaded to it and controlled by *PWL*. A font editor can be used to add fonts available through downloading or purchase of ROM cartridges.

*PWL* worked smoothly and without incident on the LaserJet, the LaserJet+, and the Canon LBP8. I tested *PWL* with over a dozen other memory-resident programs loaded and experienced no difficulty. *PWL* makes day-to-day use of a laser printer far more convenient and is well worth its cost on this score. Some of its fancy features can be wonderfully helpful on occasion.

**COMPUTER EDITYPE SYSTEMS' MAGIC SERIES** One of my favorite word processing programs isn't a word processor. *Magic Index* and its siblings, *Magic Bind* and *Magic Print*, are text-formatting programs that can be used in lieu of *WordStar*'s printing facilities and *Mail-*

*Merge*. *Magic Print* is the simplest version and concentrates on formatting. *Magic Bind* includes a mail-merge facility, and *Magic Index* adds automatic indexing and a table of contents. Advanced features, such as footnotes, proportional spacing, multiline headers and footers, automatic chapter and section numbering, and much more, are also available.

*Magic* works like Polaris's *PrintMerge* in many respects. You use dot commands (with double dots instead of the normal single dots) for a very long list of print controls embedded in a *WordStar* file and use *Magic* to print the file. The type quality is perhaps the most notable improvement over normal *WordStar* printing.

*Magic* has now been upgraded for the LaserJet and LaserJet+, in both DOS and CP/M versions. It offers all the features mentioned above as well as enhancements

### ■ Printworks for Lasers offers some clever features that go beyond the sophistication built into laser printers.

for laser printing. Among the enhancements are six grades of boldfacing (available even with fonts that don't normally offer bold), line and box drawings, simple graphics for logos and letterheads, and odd/even page batch processing to facilitate double-sided printing. *Magic* can even do kerning (modify spacing between characters in  $1/20$ -inch increments).

Text printed with *Magic* on a LaserJet+ is superb. Proportionally spaced material has an indefinable "something" that radiates professionalism. Computer EdiType Systems has always had a way with proportional text, but *Magic* surpasses even the fine quality obtainable with *Microsoft Word* and other word processors designed to handle lasers. The *Magic* series is a bit expensive, but considering that indexing and other advanced features are included with the

high-end version, it may prove to be a bargain for critical users.

**INSIGHT DEVELOPMENT'S LASER-CONTROL 100** LaserControl is the designation for a series of three products that control and enhance the operation of LaserJet and LaserJet+ printers. The products enable the LaserJet to emulate the Diablo 630, the NEC 5510/7750 or the Qume Sprint 5, and the Epson MX-80 printer. This combination of emulations, in conjunction with the normal LaserJet command structure, lets the printer run with almost any word processing or graphics program.

LaserControl 100 does the emulations in memory on an IBM PC, IBM compatible, or Texas Instruments PC. The appropriate drivers are loaded once and remain resident until the PC is restarted or turned off. LaserControl 200 is a printed circuit card that is plugged into the bus of an IBM or TI computer. LaserControl 300 is a standalone box with similar circuitry and its own power supply. It can be used with any computer that has an RS-232 serial or Centronics parallel port.

I tested the *LaserControl 100* software version of *LaserControl*. Three software drivers can be used, one for the basic *LaserControl* functions and one each for daisy wheel and graphics printer emulation. The emulation drivers occupy 2.5K bytes and 6.2K bytes of RAM, respectively, which is quite compact for their functions. Both emulation drivers need be loaded only if both emulations are required, so the minimal memory consumed can be reduced by loading only one. *LaserControl* also controls sending



#### F A C T F I L E

*Printworks for Lasers*  
SoftStyle Inc.  
7192 Kalanianaole Ave.  
Honolulu, HI 96825  
(808) 396-6368

List Price: \$125  
Requires: 60K RAM resident with 256K  
program; Canon Laser Beam or Hewlett-Packard LaserJet or LaserJet+.

CIRCLE 80 ON READER SERVICE CARD

# The \$75 Custom Forms Factory.

## FormTool™

Software to create, edit and  
customize any type of forms

FLATLY ENCLOSED  
DO NOT BEND  
OR X-RAY!

BLOC  
development corporation



With new FormTool™ all your business forms can be business-like. FormTool is the first and only forms editor that gives you everything you need. No more ruler and pen; you'll draw lines at the press of a button.

**Grids, text, spacing – everything. Made simple.** Forget your word processor's limitations. FormTool gives you intelligent line drawing, powerful editing, boldfacing, justification, block operations, variable form sizes, and much more.

**Old forms. New forms.** Simplify and standardize all your old forms in

no time. Probably improve most of them, too. What's more, the needed forms you've just never taken the time to create are practically done before you start.

When you need a new form, you can instantly produce a prototype. Then test it before you spend money on printing.

FormTool stores all your forms as standard ASCII files. So you'll never lose an "original" again.

**User interface that won't limit – or intimidate – anybody.**

Experts and beginners all agree. FormTool is so adaptable, it will help

you design any form. From time sheets, expense reports, right down to the most customized form your business needs.

**Watch new ideas take form.**

With FormTool, you'll find all kinds of better ways to manage, collect data and streamline your information flow. It means better forms. Simpler forms. Perhaps even fewer forms.

**To order, contact your local dealer or call toll free 1-800-231-1149** [In Florida, 305-531-5486]. (Visa and MasterCard accepted). Or send us a check; Florida residents add 5% sales tax.

REQUIREMENTS: IBM PC/XT/AT or 100% compatible, 256K Ram, IBM compatible Dot Matrix Printer or Hewlett Packard Laser Printer.

**BLOC**  
development corporation  
1301 Dade Blvd., Miami Beach, FL 33139

CIRCLE 515 ON READER SERVICE CARD

**ORDER TOLL FREE  
24 HOURS EVERY DAY**  
**800-662-2686**

**HARDWARE**

**COMPUTERS**

(IT, AT&T, PANASONIC, CORONA, OLIVETTI, ATARI) . CALL

**MODEMS, BOARDS, DRIVES**

Smartmodem 1200	378	8 Function Card 384K	199
Smartmodem 1440	378	8 Function Card 384K	219
Smartmodem 2400	578	Smartbus 384K	275
Ricoh Videl 1200 Modem	235	Advantage	359
Ricoh Videl 2400 Modem	499	Rompage	299
Ventel 1/2 Card	365	J-Link 2	299
Percom 1200 Modem	235	Serial 2	299
Genoa Spectrum	299	10MB H.D. w/Card	419
Percom 384K	399	20MB H.D. w/Card	519
Video 7 88A+	195	Tekn 558	389
Serial Epk	299	Densimex 300	379

**PRINTERS & MONITORS**

Epson All Models	- Dot Matrix 8 Dot/line	. CALL	
Panasonic 1091	248	Minolta 3100	149
Panasonic 1092	248	Minolta 3100	219
Panasonic 1093	449	Minolta 710/722	459/529
Toshiba 1340	569	Toscan 121/123	125/139
Toshiba 341 Parallel	819	Toscan 820	389
Toshiba 381	1099	Toshiba 630/640	429/495

**SOFTWARE**

**ACCOUNTING & FINANCIAL**

BPI Accounting/Med	309	Managing Your Money	166
BPI Inv or Job Cost	419	PriceMaster/Module	299
Real World/Models	368	Book To Basics Accts	209
CPA+	368	Tax Preparer	179

**DATABASE**

Clipper III	359	Reflex	83
Clipper IV	500	Relational 5000	149
Clipper IV & Report	195	Oracle 4.0	189
Microsoft Rdb	549	Q-BASIC w/256K Card	225

**SPREADSHEETS & INTEGRATED SOFTWARE**

Lotus 1-2-3	Cost Symphonix	Cost	
Ability	289	Network II	99
Smart SIS System	478	PFS Plan	95
Spreadsheets Auditor 2	99	Twain	95

**WORD PROCESSING**

Microsoft Word	219	WordPerfect 5000	149
Word Perfect	225	Office Writer/Speaker	149
Multiwrite	219	Thimble	104
Screen It!	258	Wordy	95

**GRAPHICS**

Charminator	219	Autocad	Cost
Signature	155	PC-Autocad	299
Microsoft Chart 2	115	PC-Visio	299
Encarta	115	PC-Visio/Visio Combo	399
Encarta	115	Impression	399
Desq	119	Microsoft Paint	175
Desqview	59	Microsoft Fontan	205
Gem Collection	119	Microsoft C	239
Printy	119	Microsoft PCL	239
Printy	78	PCdoc	149
Subscript	78	PCdoc MT+	235

**UTILITIES & LANGUAGES**

Superpacard	209	Format	92
Timing 2.0	259	Turner Pascal	39
Pop-Up Desktop	49	True Basic	96
Spotlight	52	Quick Basic	83
StarCalc	31	StarCalc	99
Desq	119	Microsoft Paint	175
Desqview	59	Microsoft Fontan	205
Gem Collection	119	Microsoft C	239
Printy	119	Microsoft PCL	239
Printy	78	PCdoc	149
Subscript	78	PCdoc MT+	235

Call Toll Free 24 hrs Every Day  
**800-662-2686** orders only

for Co. Orders, Tech Support, Price Quotes, Info  
**415-668-9350** 9-5 pacific time, m-f  
Call or Write for Free Catalog

PAYMENT (No Fee For Credit Cards) Visa, MasterCard,  
Cashier's Checks, Personal Checks with 2 wk. hold.  
Qualified P.O.'s Co. residents add sales tax.  
SHIPPING: UPS ground \$1.50 per order, \$4 min. FREE for  
orders over \$100, UPS 3rd day \$3.50, 2nd day \$5 min FREE for  
SW orders over \$1500. Printers, Monitors, Disk Drives,  
computers - Call for charges.

All Products New with full warranties  
Price & availability subject to change without notice



584 CASTRO ST. SUITE #87 SAN FRANCISCO, CA 94114  
a division of MCIS Inc. Computer & Software specialists since 1971

CIRCLE 527 ON READER SERVICE CARD PC MAGAZINE ■ FEBRUARY 11, 1986

## ■ LASER UTILITIES

data to the LaserJet, so there is no need to use the DOS MODE command or other setup arrangements outside the program.

You interact with the *LaserControl* system using a beautiful menu program. Just as in I-2-3, a command is selected by moving the cursor along a row of options or typing the first letter of the command. A brief description of each option's function is shown on the line below the option line. The ten lines below the menu are used for prompting and explanatory messages, and the bottom portion of the screen displays a "setting sheet" indicating how various options are set.

Once you select a printer to emulate, the setting sheet allows you to specify the

■ You interact with the  
*LaserControl* system  
using a beautiful menu  
program.

font cartridge, type style, how many copies to run, margin, and line and character spacing and make other adjustments. Modified setting sheets can be saved for future use.

My tests of *LaserControl* went smoothly and without incident. *WordStar* and I-2-3 worked perfectly using the various printer emulations. Several programs that output Epson graphics produced lovely results on a LaserJet.

The hardware versions of the *LaserControl* system (not tested here) offer increased output speed. The internal *LaserControl* 200 card can operate from a PC's parallel port and thereby receive data faster than through a serial port. It uses a built-in microprocessor to free the host CPU for other tasks. *LaserControl* 300 has both serial and parallel input ports and can be used with almost any type of computer. The only catch to this is that the menu program is supplied only for PC-type computers, so CP/M users have to access the program through command-line instructions.

There are some other programs that

offer Epson emulation for the LaserJet (most notably *Printworks for Lasers*), but none that also emulate Diablo, NEC, and Qume printers. The ability to use existing word processing software rather than purchasing and learning a completely new system may be a critical factor for you. Many of the newer laser printers are now including Diablo emulation for just this reason.

*LaserControl* allows an HP owner to have the best of both worlds in many respects. The user interface is intuitive, familiar, and attractive. The product line is reasonably priced for what's delivered—an attractive adjunct to the LaserJet.

**SOFTCRAFT'S FANCY WORD AND FANCY FONT** Many available programs take advantage of the graphics abilities of dot matrix printers to add a multitude of fonts to them. Libraries of fonts have been created for programs like *Fontrix*, *Fantasy*, and *Fancy Font*. While laser printers are not impact printers (no dot wires or daisy wheel elements actually strike the paper), they are dot matrix printers.

At 300-dot-per-inch resolution, a laser printer's dot resolution is higher than almost any dot matrix printer's. Laser printers can also position their dots with unparalleled accuracy. This is what makes the eye think the characters are fully formed and typeset-like in quality.

Happily, the techniques used to create type fonts for dot matrix printers can be applied directly to laser printers as well. SoftCraft, developer of the highly regarded *Fancy Font* programs, has done


**FACT FILE**

**Magic Series**  
Computer EdiType Systems  
509 Cathedral Pkwy., #10A  
New York, NY 10023  
(212) 222-8148

**List Price:** *Magic Print*, \$195; *Magic Bind* (including *Magic Print*), \$250; *Magic Index* (including *Magic Bind* and *Magic Print*), \$295

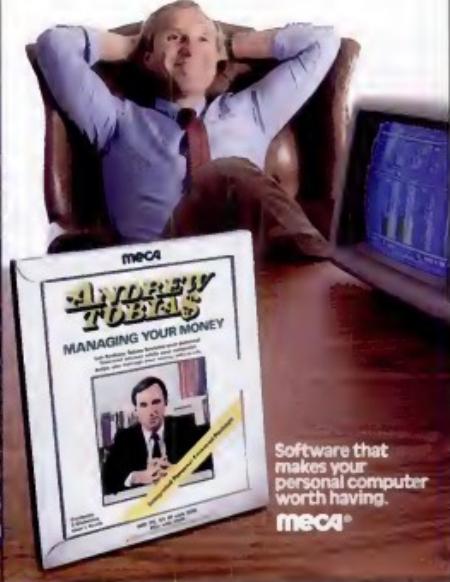
**Requires:** 48K RAM, Hewlett-Packard LaserJet.

CIRCLE 629 ON READER SERVICE CARD

MANAGING YOUR CHECKBOOK?  
MANAGING YOUR BUDGET?  
MANAGING YOUR BILLS?  
MANAGING YOUR CASH FLOW?  
MANAGING YOUR TAXES?  
MANAGING YOUR INSURANCE?  
MANAGING YOUR STOCKS?  
MANAGING YOUR BONDS?  
MANAGING YOUR REAL ESTATE?  
MANAGING YOUR TAX SHELTERS?  
MANAGING YOUR SAVINGS?  
MANAGING YOUR MORTGAGE?  
MANAGING YOUR AUTO LOAN?  
MANAGING YOUR RETIREMENT?  
MANAGING YOUR CALENDAR?  
MANAGING YOUR CHARGE ACCOUNTS?  
MANAGING YOUR CAPITAL GAINS?  
MANAGING YOUR ANNUITIES?  
MANAGING YOUR APPOINTMENTS?  
MANAGING YOUR DIVIDENDS?  
MANAGING YOUR INTEREST?  
MANAGING YOUR RECORDS?  
MANAGING YOUR VALUABLES?  
MANAGING YOUR KEOGH'S?  
MANAGING YOUR IRA'S?



MANAGING YOUR MONEY  
BY ANDREW TOBIAS.  
THE ONLY FINANCIAL  
SOFTWARE THAT DOES IT ALL.



© 1985 • MECA • 285 RIVERSIDE AVENUE, WESTPORT, CT 06880 • (203) 222-1000 • For IBM PC, XT, AT, PC Jr (256K), TANDY 1200+HD, TANDY 1000 (256K), APPLE IIe, IIc, IIe/IIcx, Two Drives

CIRCLE 151 ON READER SERVICE CARD

## ■ LASER UTILITIES

exactly that with two new programs for the HP Laserjet. *Fancy Font* itself has been released in an HP version, and a new program called *Fancy Word* adds custom typeface facilities to Microsoft's popular word processor, *Microsoft Word*.

*Fancy Font* has been reviewed here and elsewhere over the years, so I'll just



### F A C T F I L E

#### LaserControl 100

Insight Development  
2115 Fourth St.  
Berkeley, CA 94709  
(415) 527-8646

List Price: \$180

Requires: 13K RAM resident, 35K RAM  
for menu program; Hewlett-Packard LaserJet  
or LaserJet+.

CIRCLE 620 ON READER SERVICE CARD

repeat the essentials. Dot matrix versions generate excellent quality text by making multiple passes of the printhead, often six or even more for certain typefaces, and by moving the head in increments as small as  $\frac{1}{216}$ th of an inch. Characters are defined in very dense matrixes in sizes up to 1 inch high. With the Laserjet's 300-dpi resolution, *Fancy Font* offers even better results.

*Fancy Font* works with the HP Laserjet and Laserjet+ as well as the Canon LBP-8 AI laser printer. The Laserjet+ can accept a full page of graphics fonts, but the small buffer in the other printers restricts graphics fonts to smaller areas. The printers' internal or cartridge fonts are completely usable, and a normal document can contain a mixture of both native laser fonts and the special *Fancy Font* graphics fonts.

*Fancy Word* is modestly categorized by SoftCraft as "a special adaptation of

This is FixedWidth.

This is SansSerif.

This is SansCompressed.

This is Classic.

This is Roman.

This is RomanLight.

This is Script.

This is UnslantedItalic.

This is Tall.

This is OldEnglish.

Θτ ιτ Γματπγθθθθθ

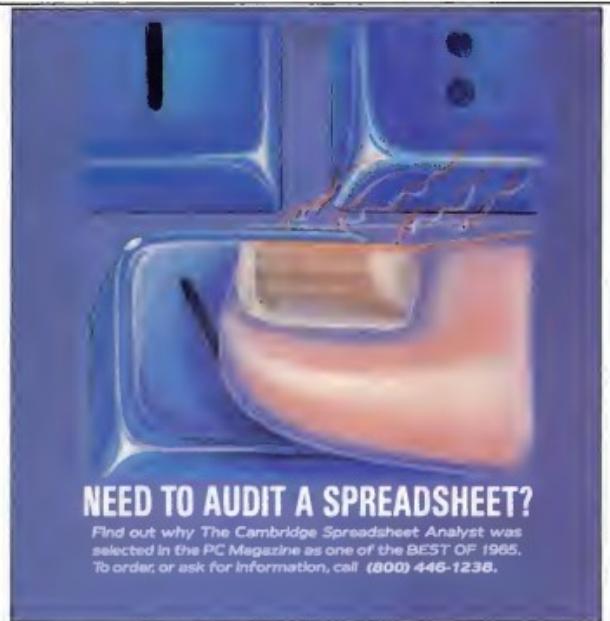
Τ(;)f }f M-ιu(S†‡[x‡‡✓←←  
←  
←-

With SoftCraft's *Fancy Font*, the HP Laserjet can produce software-generated fonts that look just as good as the printer's internal or cartridge typefaces.

*Fancy Font* for use with *Microsoft Word*." It is certainly that, but it seems like much more. Using *Fancy Font* is a somewhat fragmented operation; you constantly jump back and forth between editor and *Fancy Font*. With *Fancy Word*, on the other hand, everything can be

## NEED TO AUDIT A SPREADSHEET?

Find out why The Cambridge Spreadsheet Analyst was selected in the PC Magazine as one of the BEST OF 1985. To order, or ask for information, call (800) 446-1236.



Cambridge Software Collaborative, Suite 200, University Place, Cambridge, MA 02138  
CIRCLE 117 ON READER SERVICE CARD

PC MAGAZINE ■ FEBRUARY 11, 1986

done from within *Microsoft Word* (assuming your setup is equipped with a hard disk).

*Fancy Word* integrates the graphics fonts directly into *Microsoft Word's* Format Character command. The new fonts will appear on the menu of available font options. All the normal *Microsoft Word* formatting commands are used in their standard sense, including style sheets and the other advanced features. Since *Microsoft Word* is perhaps the most flexible word processor when it comes to output formatting, it was wise of SoftCraft to add *Fancy Word's* capabilities on top of, rather than in lieu of, *Microsoft Word's* facilities.

*Fancy Word* looks like a special printer to *Microsoft Word*. Printing is to a file rather than directly to a printer. Once the file printing is complete, *Microsoft Word's* Library Run command is used to invoke a customized version of Pfont and the actual printing begins.

Both *Fancy Font* and *Fancy Word* worked flawlessly on my LaserJet+. Using *Fancy Font* with *WordStar* or an editor is perfectly workable, but the integration of *Fancy Word* is far superior for those using *Microsoft Word*.

The quality of the output from either program is simply gorgeous. The *Fancy Font* graphics typefaces do not look any rougher or less elegant than the laser printer's internal or cartridge typefaces (see sample). The Old English and Script fonts look fainter than the other fonts because they are stroke type fonts in which the 1-pixel-wide strokes are visible.

The huge library of optional fonts for

the dot matrix printers *Fancy Font* supports has been converted for laser printers. I tested half a dozen disks with varying sizes of Sans Serif, Sans Serif Compressed, and Classic typefaces in sizes from a minute 3 points to a giant 72 points. The process of incorporating new type fonts is a little tricky, but those who understand *Microsoft Word's* PRD printer definition scheme or who can follow directions exactly should catch on quickly. The PRD file can be made larger than the memory *Microsoft Word* allocates, but the information necessary at any given point during printing can be "swapped" to and from disk as needed. My current PRD file has well over two dozen fonts and works like a charm.

Buying into the SoftCraft system will undoubtedly lead to more and more fonts over time. There are also supplemental program utilities for kerning, *WordStar* and *WordPerfect* adapters, and more.

Printing is a bit on the slow side when graphics fonts are used, but the added flexibility and output quality more than compensate. If the ability to incorporate a wide variety of typefaces into documents is important (and this is one of the primary reasons for buying a laser printer in the first place), I highly recommend the SoftCraft products. And if you use *Microsoft Word* with a laser printer, run to order *Fancy Word* immediately.

**SUMMARY** The programs reviewed here unleash the power of the laser printer for users of both the old favorite word processors and the new generation of PC powerhouses. The superb, near-typeset quality locked inside the arcane control sequences of the HP LaserJet line and the Canon Laser Beam series are now equally accessible to *WordStar* users, those with a favorite text editor, and *Microsoft Word* fans as well. ■

**IT'S THIS EASY WITH THE ANALYST.**

\* Automatic scanning of Every Cell for errors \* Tools to investigate underlying assumptions \* Reports for complete documentation \* \$149 (\$10 for Demo Disk)

To order, or ask for information, call (800) 446-1238.



## FACT FILE

### *Fancy Word*

*Fancy Font*

SoftCraft

222 State St., #400

Madison, WI 53703

(800) 351-0500

(608) 257-3300

List Price: *Fancy Word*, \$140;

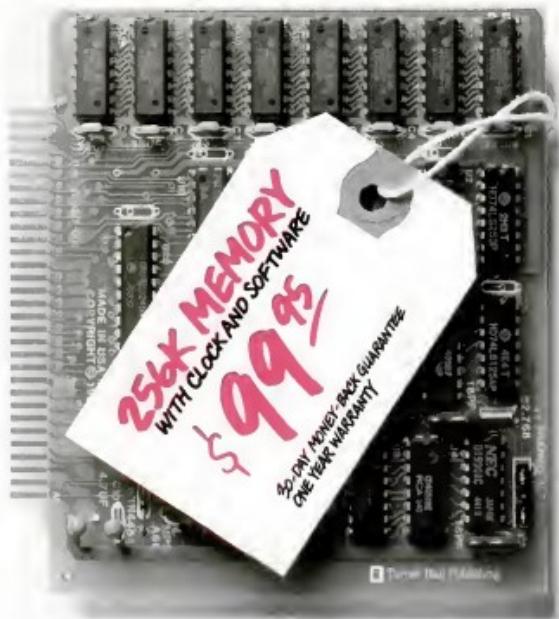
*Fancy Font*, \$180

Requires: 128K RAM, Hewlett-Packard LaserJet or LaserJet+ or Canon Laser Beam.

CIRCLE 89 ON READER SERVICE CARD

Cambridge Software Collaborative, Suite 200, University Place, Cambridge, MA 02138  
CIRCLE 118 ON READER SERVICE CARD

# ACTUAL SIZE.



# ACTUAL PRICE.

#### Introducing The Turner Hall™ Card.

The lowest priced complete 256K memory expansion board you can buy.

We made it so inexpensive by using the very latest 1256K RAM chips instead of four times as many 64K chips.

That same technology makes the Card fit in a half-length PC/XT™ slot. And the reduced chip count increases reliability, so we can offer a 30-day money-back guarantee and a 1-year warranty.

The Card comes with a clock/calendar with replaceable battery backup, illustrated Owner's Manual, and software including clock, print spooler, and disk emulator.

That's everything the most popular

multifunction boards have. Except a couple of extra ports and a lot of extra cost.

IBM® or Compaq® owners will find the Card remarkably easy to install. And if you have any questions after you buy, call our Help Hotline.

The Turner Hall Card is just \$99.95\*, plus \$2.00 shipping (\$12.00 outside of U.S.A.).

Order by phone. We accept MasterCard or Visa. Or send us a check or money order with your business card attached.

**Turner Hall Publishing**  
10201 Torre Ave., Cupertino, CA 95014

**1-800-556-1234 x526.**  
(In CA 800-441-2345 x526).

\*CA residents add 7% sales tax (\$7.00). Requires IBM PC, PC/AT, Portable PC, or Compaq with at least 256K of memory. Turner Hall is a trademark of Turner Hall Publishing. IBM is a registered trademark, and PC/AT is a trade mark of International Business Machines Corp. Compaq is a registered trademark of Compaq Computer Corp.

# SHELF CONSCIOUS?

Now you can organize your copies of  
**PC MAGAZINE**

Now your magazines can be a handsome addition to your decor, well organized, and easy to find, thanks to these durable library-quality cases or binders. They're made of luxury-look leatherette over high-quality binder board. And both styles are custom-designed for this or any other magazine you save, with size, color and imprint selected by the publisher. FREE transfer foil included for marking dates and volumes.



#### Magazine binders

holds your issues on individual snap-in rods, containing them and one volume \$7.95 each; 3 for \$22.50, 6 for \$42.50. Mixed titles OK for quantity prices



#### Open-back cases

store your issues for individual reference \$6.95 each; 3 for \$19.75; 6 for \$37.50. Mixed titles OK for quantity prices

**OR CALL**  
**1-212-503-5319**



#### PC Magazine

P.O. Box 5120, Philadelphia, PA 19141

Please send  Cases  Binders

TITLE \_\_\_\_\_

QUANTITY \_\_\_\_\_

PC Magazine

Other \_\_\_\_\_

PAYMENT ENCLOSED \$\_\_\_\_\_ \* Add \$1.00 per order for postage and handling. Outside USA add \$2.50 per unit cased, send US funds only

CHARGE (Minimum \$10)  
American Express  MasterCard  
 Visa

Card No \_\_\_\_\_ Exp Date \_\_\_\_\_

Signature \_\_\_\_\_

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_

\*Residents of PA add 6% sales tax

## ■ PROGRAMMING/UTILITIES ■ CHARLES PETZOLD

# FIX UP COMMANDS WITH DOS-EDIT

*DOS command-line editing facilities are primitive at best. Here's a memory-resident DOS-EDIT utility that saves you keystrokes by providing full-screen editing.*

How many times have you reached for the Cursor up key to correct something you've mistyped at the DOS command level? I do it a lot. It's almost instinctive. The text is still there on the screen, so all you *should* have to do is move the cursor up, fix the text, and reenter. But this natural keyboard maneuver doesn't work in DOS.

I wrote DOS-EDIT to make it work. DOS-EDIT is a resident program that allows you to move to, edit, and reexecute DOS commands that are still on the screen, much as you can with the BASIC interpreter. And while of greatest use when you're on the DOS command level, DOS-EDIT will also work with such DOS programs as EDLIN or DEBUG, and with some other programs whose keyboard entry can be edited with the normal DOS editing keys (F1 to F5 and the cursor keys).

If you don't know about the DOS editing keys, you should at least start by learning about them. Strangely enough, they

got lost from PC-DOS 2.1 documentation when a separate *User's Guide* was split off from the main manual. (The *User's Guide* for PC-DOS 3.0 and 3.1 does describe them, and they do work under Version 2.1.) The DOS editing keys themselves, however, can recall only the immediately previous command. DOS-EDIT is often easier to use than the DOS editing keys even for that, and it can also retrieve other commands still on the screen, as well.

You can put DOS-EDIT.COM in your AUTOEXEC.BAT file so that it executes once and remains resident for the duration of your PC session. Because it intercepts some interrupts, it may conflict with other resident programs, particularly those that can be executed more than once. If you use the DOS ASSIGN program, for example, you'll want to execute DOS-EDIT in your AUTOEXEC.BAT file before ASSIGN runs for the first time. [The same holds true for SideKick—Ed.] In general, if DOS-EDIT does not seem to work at first, try

placing it earlier in your AUTOEXEC.BAT and rebooting.

**DOS-EDIT ON YOUR MACHINE** You can get DOS-EDIT.COM in one of several ways. The program is on the *PC Magazine* Interactive Reader Service, and you can download it via modem by calling (212) 696-0360. If you just want the executable program and your communications software supports the Xmodem file transfer protocol, you only need to download DOS-EDIT.COM.

If your communications software does not support Xmodem, you can download DOS-EDIT.ASC, rename it to DOS-EDIT.BAS, load it into the BASIC interpreter, and run it once. The DOS-EDIT.BAS BASIC program will create DOS-EDIT.COM for you. If you have no modem, you can type the DOS-EDIT.BAS program shown as Figure 1 into your BASIC interpreter and run it.

Although DOS-EDIT.BAS contains

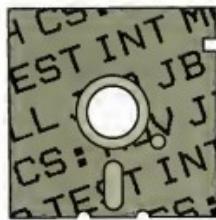
```

100 REM -- BASIC PROGRAM TO CREATE DOS-EDIT.COM
110 OPEN "DOS-EDIT.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR IT% = 1 TO 77
150   LINESUM% = 0
160   FOR JT% = 1 TO 8
170     READ BYTE%
180     CHECKSUM = CHECKSUM + BYTE%
190     LINESUM% = LINESUM% + BYTE%
200     LSET A$ = CHR$(BYTE%)
210     PUT #1

```

(Figure 1 continues)

Figure 1: This BASIC program will produce DOS-EDIT.COM.



## ■ PROGRAMMING/UTILITIES

```

220    NEXT J%
230    READ LINECHECK%
240    IF LINECHECK% <> LINESUM% THEN PRINT "Error in Line";280 + 10 * I%
250    NEXT I%
260    CLOSE
270    IF CHECKSUM = 59165 THEN PRINT "Successful Completion!" : END
280    PRINT "COM file is not valid!" : END
290    DATA 233, 46, 2, 40, 67, 41, 32, 67, 528
300    DATA 111, 112, 121, 114, 105, 103, 104, 116, 886
310    DATA 32, 49, 57, 56, 53, 32, 90, 105, 474
320    DATA 102, 102, 45, 68, 97, 118, 105, 115, 752
330    DATA 32, 80, 117, 98, 108, 105, 115, 104, 759
340    DATA 105, 110, 103, 32, 67, 111, 46, 0, 574
350    DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
360    DATA 128, 0, 0, 0, 0, 0, 0, 125, 253
370    DATA 2, 130, 2, 137, 2, 194, 2, 140, 609
380    DATA 2, 194, 2, 153, 2, 194, 2, 167, 716
390    DATA 2, 175, 2, 178, 2, 195, 2, 201, 757
400    DATA 2, 46, 198, 6, 55, 1, 0, 128, 436
410    DATA 252, 10, 116, 5, 46, 255, 46, 47, 777
420    DATA 1, 46, 198, 6, 55, 1, 255, 156, 718
430    DATA 46, 255, 30, 47, 1, 46, 198, 6, 629
440    DATA 55, 1, 0, 46, 198, 6, 58, 1, 365
450    DATA 0, 207, 251, 46, 128, 62, 55, 1, 750
460    DATA 0, 116, 13, 46, 128, 62, 58, 1, 424
470    DATA 0, 117, 46, 128, 252, 0, 116, 5, 664
480    DATA 46, 255, 46, 51, 1, 156, 46, 255, 856
490    DATA 30, 51, 1, 61, 0, 72, 117, 24, 356
500    DATA 232, 57, 0, 46, 128, 62, 58, 1, 584
510    DATA 0, 116, 234, 232, 33, 0, 46, 255, 916
520    DATA 6, 56, 1, 46, 254, 14, 58, 1, 436
530    DATA 207, 128, 252, 2, 115, 210, 128, 252, 1294
540    DATA 0, 116, 232, 232, 9, 0, 46, 128, 763
550    DATA 62, 58, 1, 0, 202, 2, 0, 83, 408
560    DATA 46, 139, 30, 56, 1, 46, 138, 7, 463
570    DATA 42, 228, 91, 195, 80, 83, 81, 82, 882
580    DATA 87, 30, 6, 140, 200, 142, 216, 142, 963
590    DATA 192, 180, 15, 205, 16, 254, 204, 136, 1202
600    DATA 38, 59, 1, 180, 3, 205, 16, 137, 639
610    DATA 22, 60, 1, 232, 124, 0, 58, 54, 551
620    DATA 61, 1, 116, 97, 188, 2, 205, 16, 678
630    DATA 180, 0, 156, 46, 255, 30, 51, 1, 719
640    DATA 60, 27, 116, 81, 60, 8, 117, 11, 480
650    DATA 10, 210, 116, 226, 254, 202, 232, 226, 1476
660    DATA 0, 235, 219, 68, 13, 117, 12, 232, 888
670    DATA 117, 0, 176, 13, 170, 254, 6, 58, 794
680    DATA 1, 235, 203, 60, 32, 114, 24, 128, 797
690    DATA 62, 62, 1, 0, 116, 5, 232, 178, 656
700    DATA 0, 235, 7, 185, 1, 0, 180, 10, 618
710    DATA 205, 16, 232, 68, 0, 235, 175, 134, 1065
720    DATA 196, 45, 71, 0, 114, 178, 61, 12, 677
730    DATA 0, 119, 173, 3, 192, 139, 248, 255, 1129
740    DATA 149, 63, 1, 235, 153, 139, 22, 60, 822
750    DATA 1, 180, 2, 205, 16, 7, 31, 95, 537

```

(Figure 1 continues)

760 DATA	98,	89,	91,	88,	195,	138,	22,	60,	773
770 DATA	1,	195,	10,	246,	116,	2,	254,	206,	1030
780 DATA	195,	42,	210,	195,	10,	210,	117,	6,	985
790 DATA	138,	22,	59,	1,	235,	236,	254,	202,	1147
800 DATA	195,	58,	22,	59,	1,	114,	5,	42,	496
810 DATA	210,	235,	12,	144,	254,	194,	195,	232,	1476
820 DATA	35,	0,	139,	22,	60,	1,	195,	254,	706
830 DATA	198,	195,	138,	14,	59,	1,	254,	193,	1052
840 DATA	42,	202,	42,	237,	176,	32,	180,	10,	921
850 DATA	205,	16,	195,	128,	54,	62,	1,	255,	916
860 DATA	195,	232,	63,	0,	195,	43,	201,	191,	1120
870 DATA	128,	0,	137,	62,	56,	1,	252,	180,	816
880 DATA	2,	205,	16,	180,	8,	205,	16,	170,	802
890 DATA	65,	254,	194,	58,	22,	59,	1,	118,	771
900 DATA	238,	79,	176,	32,	253,	243,	174,	252,	1447
910 DATA	116,	3,	254,	193,	71,	71,	136,	14,	858
920 DATA	58,	1,	195,	82,	139,	248,	232,	31,	986
930 DATA	0,	254,	194,	58,	22,	59,	1,	118,	706
940 DATA	245,	90,	195,	191,	32,	0,	138,	218,	1109
950 DATA	138,	22,	59,	1,	232,	9,	0,	254,	715
960 DATA	202,	58,	211,	125,	247,	254,	194,	195,	1486
970 DATA	180,	2,	205,	16,	180,	8,	205,	16,	812
980 DATA	151,	185,	1,	0,	180,	10,	205,	16,	748
990 DATA	195,	43,	192,	142,	216,	196,	30,	132,	1146
1000 DATA	0,	46,	137,	30,	47,	1,	46,	140,	447
1010 DATA	6,	49,	1,	196,	30,	88,	0,	46,	416
1020 DATA	137,	30,	51,	1,	46,	140,	6,	53,	464
1030 DATA	1,	14,	31,	186,	89,	1,	184,	33,	539
1040 DATA	37,	205,	33,	186,	130,	1,	184,	22,	798
1050 DATA	37,	205,	33,	186,	49,	3,	205,	39,	757

(Figure 1 ends)

checksums on each DATA line to help you find typing errors, you could still encounter other problems. If you get an "Out of data in line 170" message, you probably left out a line or two. If you don't get error messages on any line but you still get a "COM file is not valid" message, you may have typed one line twice.

If you get an "Illegal function call in line 200" message, it probably means that one of your DATA statements has fewer or

more than nine numbers in the line. Take out line 200 temporarily to track down the faulty line. Then put line 200 back in when everything is fixed.

If DOS-EDIT reports a "successful completion" but running or using the program causes your system to lock up, check that all your line numbers are correct. Finally, don't assume that the only place you could have made a typing error is in the DATA statements—check the program

part of DOS-EDIT.BAS also.

Probably the best way to get DOS-EDIT (and learn about it in the process) is to download or type in the assembly language listing shown in Figure 2 into a file called DOS-EDIT.ASM. You must then use the IBM or Microsoft Macro Assembler and use MASM, LINK, and EXE2BIN to assemble it into the executable DOS-EDIT.COM program.

(continued)

```
; DOS-EDIT.ASM -- Resident DOS Command Line Editor
;
; =====
CSEG           Segment
Assume    CS:CSEG
KeyboardBuffer Org    0000h
Label      Byte
Entry:      Org    0100h
Jmp       Initialize
```

(Figure 2 continues)

Figure 2: The assembly language listing for DOS-EDIT.COM.



## ■ PROGRAMMING/UTILITIES

```

;      All Data
; -----
        db      " (C) Copyright 1985 Ziff-Davis Publishing Co."
OldInterrupt21 dd      ?          ; Original Interrupt 21 vector
OldInterrupt16 dd      ?          ; Original Interrupt 16 vector
DoingBuffKey  db      0          ; Flag for doing Function Call 0Ah
BufferPointer dw      KeyboardBuffer ; Pointer to Keyboard Buffer
BufferCounter db      0          ; Number of characters in buffer
MaxCharCol   db      ?          ; Maximum Character Column on screen
OriginalCursor dw      ?          ; Place to save cursor on full-screen
InsertOn     db      0          ; Insert mode flag

KeyRoutine    dw      Home,Up,PgUp,Dummy,Left,Dummy,Right
                dw      Dummy,End,Down,PgDn,Insert,Delete

;      New Interrupt 21 (DOS Function Calls)
; -----
NewInterrupt21 Proc Far
        Mov     CS:[DoingBuffKey],0      ; Turn flag off initially
        Cmp     AH,0Ah
        Jz      BufferedInput
        Jmp     CS:[OldInterrupt21]       ; If not, do regular interrupt
BufferedInput: Mov     CS:[DoingBuffKey],-1    ; If so, turn on flag
        PushF
        Call    CS:[OldInterrupt21]       ; Simulate regular interrupt
        Mov     CS:[DoingBuffKey],0      ; Turn off flag
        Mov     CS:[BufferCounter],0      ; Re-set character counter
        IRet
NewInterrupt21 EndP

;      New Interrupt 16 (BIOS Keyboard Routine)
; -----
NewInterrupt16 Proc Far
        Sti
        Cmp     CS:[DoingBuffKey],0      ; Re-enable interrupts
        Jz      DoNotIntercept
        Cmp     CS:[BufferCounter],0      ; Check if chars in buffer
        Jnz
        Substitute
        Cmp     AH,0
        Jz      CheckTheKey
DoNotIntercept: Jmp    CS:[OldInterrupt16]       ; Otherwise, do old interrupt

```

(Figure 2 continues)

## ■ PROGRAMMING/UTILITIES

```

CheckTheKey: PushF      CS:[OldInterrupt16]    ; Save flags
Call      CS:[OldInterrupt16]    ; Do regular interrupt
          Cmp AX,4800h           ; Check if up cursor
          Jnz NotTriggerKey     ; If not, don't bother
          Call FullScreen        ; Move around the screen
          Cmp CS:[BufferCounter],0 ; Any chars to deliver?
          Jz  CheckTheKey        ; If not, get another key
ReturnBuffer: Call GetBufferChar   ; Otherwise, pull one out
              Inc CS:[BufferPointer] ; Kick up the pointer
              Dec CS:[BufferCounter]; And knock down the counter
NotTriggerKey: IRet            ; And go back to calling prog

; Substitute Key from Buffer
; -----
Substitute: Cmp AH,2           ; See if shift status check
             Jae DoNotIntercept ; If so, can't be bothered
             Cmp AH,0           ; See if get a key
             Jz  ReturnBuffer   ; If so, get the key above
             Call GetBufferChar  ; Otherwise get a key
             Cmp CS:[BufferCounter],0 ; And clear zero flag
             Ret  2               ; Return with existing flags

NewInterrupt16 EndP

; Get Buffer Character
; -----
GetBufferChar: Push  BX
                Mov   BX,CS:[BufferPointer] ; Get pointer to key buffer
                Mov   AL,CS:[BX]       ; Get the key
                Sub   AH,AH           ; Blank out scan code
                Pop   BX
                Ret

; Full Screen Routine
; -----
FullScreen: Push  AX           ; Save all these registers
             Push  BX
             Push  CX
             Push  DX
             Push  DI
             Push  DS
             Push  ES

```

(Figure 2 continues)

```

Mov      AX,CS           ; Set AX to this segment
Mov      DS,AX           ; Do DS is this segment
Mov      ES,AX           ; And ES is also

Assume  DS:CSEG, ES:CSEG ; Tell the assembler

Mov      AH,0Fh          ; Get Video State
Int     10h              ; through BIOS
Dec     AH               ; Number of columns on screen
Mov     [MaxCharCol],AH   ; Save maximum column
Mov      AH,03h          ; BH = Page Number throughout
Int     10h              ; Get cursor in DX
Mov     [OriginalCursor],DX ; through BIOS
                           ; And save the cursor position

Call    Up               ; Move cursor up

MainLoop: Cmp   DH,Byte Ptr [OriginalCursor + 1] ; If at line
Jz    TermFullScreen    ; stated from, terminate

Mov      AH,02h          ; Set cursor from DX
Int     10h              ; through BIOS

GetKeyboard: Mov   AH,0           ; Get the next key
PushF
Call   CS:[OldInterrupt16] ; By simulating Interrupt 16h
                           ; which goes to BIOS

Cmp   AL,1Bh            ; See if Escape key
Jz    TermFullScreen    ; If so, terminate full screen

; Back Space
; -----
; -----
; -----
; -----



Cmp   AL,08h            ; See if back space
Jnz  NotBackSpace       ; If not, continue test

Or    DL,DL             ; Check if cursor at left
Jz   MainLoop           ; If so, do nothing

Dec   DL               ; Otherwise, move cursor back
Call  ShiftLeft         ; And shift line to the left
Jmp   MainLoop           ; And continue for next key

; Carriage Return
; -----
; -----



NotBackSpace: Cmp  AL,0Dh           ; See if Carriage Return
Jnz  NotCarrRet         ; If not, continue test

Call  End               ; Move line into buffer

Mov   AL,0Dh             ; Tack on a Carriage Return
Stosb
Inc   [BufferCounter]    ; By writing to buffer
                           ; One more character in buffer

```

(Figure 2 continues)

# Evry so ofn, a smpl idea

## PRD+Software. Type in your abbreviations.

It isn't often a product comes along that changes the computer world dramatically. But for anyone who uses a personal computer, PRD+ (Productivity Plus) software is the breakthrough that lets you tailor the computer to your specific needs.

With PRD+, you no longer have to type out whole words, names, addresses, salutations, mathematical formulas or any textual data. Now, you can type in abbreviations and PRD+ instantly produces the full words. Look at this example:



Type asap. Press (Space Bar)  
Result: asap is replaced on screen instantly  
with as soon as possible.

Every word is spelled correctly and, in this example, the process saved 15 keystrokes. But you can save a lot more. In fact any abbreviation can produce up to 240 characters of full words. Above all, using PRD+ does not require any change in typing habits. So, there's nothing new to learn!

You can use PRD+ standard abbreviations or create your own—since the choice is yours, you can personalize your interaction with the computer.

PRD+ is the first microcomputer software product that can improve both the SPEED and the ACCURACY of everyone who uses a personal computer! Proof of productivity improvement is built into the program. The PRD+ program can tell you, at any time, the number of keystrokes you have saved by typing the PRD+ way.

cms alng tht chngs th wrld.

It types out the words.

Discover how PRD+ will be changing your entire computer world.

You may contact us at:

Productivity Software International, L.P.  
1220 Broadway  
New York, NY 10001

Or for more information and the name of your nearest dealer call toll-free, 24 hours a day, Monday through Friday.

**1-800-346-6000**

1-800-637-8800 (in Utah) and  
1-800-982-1500 (in Alaska).

After u c PRD+ wrk, u'll nvr wnt to typ the lng way agn.



PRD+ is a trademark of RAM  
and used on IBM PC, XT, AT  
and compatibles. © 1986.  
Productivity Software International, L.P.  
PRD+ is a registered trademark of  
Productivity Software International, L.P.  
IBM is a registered trademark of  
International Business Machines Corporation.  
Intel is a registered trademark of  
Intel Corporation. Mac is a trademark of Apple Computer, Inc.

## ■ PROGRAMMING/UTILITIES

```

Jmp      MainLoop          ; And continue

; Normal Character
;

NotCarrRet: Cmp    AL,' '
                Jb     NotNormalChar   ; See if normal character
                                ; If not, continue test
                Cmp    [InsertOn],0
                Jz     OverWrite       ; Check for Insert mode
                                ; If not, overwrite
                Call   ShiftRight      ; Shift line right for insert
                JMP   Short NormalCharEnd ; And get ready to print

OverWrite:  Mov    CX,1           ; Write one character
            Mov    AH,0Ah         ; By calling BIOS
            Int   10h

NormalCharEnd: Call   Right        ; Cursor to right and print
                JMP   MainLoop      ; Back for another key

; Cursor Key, Insert, or Delete Subroutine
;

NotNormalChar: Xchg  AL,AH        ; Put extended code in AL
                Sub   AX,71        ; See if it's a cursor key
                Jc    GetKeyboard   ; If not, no good
                Cmp   AX,12        ; Another check for cursor
                Ja    GetKeyboard   ; If not, skip it
                Add   AX,AX        ; Double for index
                Mov   DI,AX        ; into vector table
                Call  [KeyRoutine + DI] ; Do the routine
                JMP   MainLoop      ; Back for another key

; Terminate Full Screen Movement
;

TermFullScreen: Mov   DX,[OriginalCursor] ; Set cursor to original
                  Mov   AH,2           ; And set it
                  Int   10h           ; through BIOS
                  Pop   ES             ; Restore all registers
                  Pop   DS
                  Pop   DI
                  Pop   DX
                  Pop   CX
                  Pop   BX
                  Pop   AX
                  Ret               ; And return to New Int. 16h

```

(Figure 2 continues)

```

;      Cursor Movement
;

Home:      Mov     DL,Byte Ptr [OriginalCursor] ; Move cursor to
            Ret          ; to original column

Up:        Or      DH,DH           ; Check if at top row
           Jz      UpEnd           ; If so, do nothing
           Dec     DH               ; If not, decrement row
UpEnd:     Ret

PgUp:      Sub     DL,DL           ; Move cursor to far left
            Ret

Left:      Or      DL,DL           ; Check if cursor at far left
           Jnz    GoWest           ; If not, move it left
           Mov     DL,[MaxCharCol] ; Move cursor to right
           Jmp    Up               ; And go up one line
           Dec     DL               ; Otherwise, decrement column
GoWest:   Ret

Right:     Cmp    DL,[MaxCharCol] ; Check if cursor at far right
           Jb     GoEast           ; If not, move it right
           Sub    DL,DL           ; Set cursor to left of screen
           Jmp    Down             ; And go down one line
           Inc     DL               ; Otherwise, increment column
GoEast:   Ret

End:       Call   TransferLine   ; Move line to buffer
           Mov    DX,[OriginalCursor]; Set cursor to original

Down:      Inc     DH               ; Move cursor down one row
            Ret

PgDn:      Mov     CL,[MaxCharCol] ; Get last column on screen
           Inc     CL               ; Kick it up by one
           Sub    CL,DL           ; Subtract current column
           Sub    CH,CH           ; Set top byte to zero
           Mov     AL,' '
           Mov     AH,0Ah           ; Character to write
           Int    10h              ; Write blanks to screen
           ;      through BIOS

Dummy:    Ret

;      Insert and Delete
;

Insert:    Xor     [InsertOn],-1 ; Toggle the InsertOn flag
            Ret          ; and return

Delete:   Call    ShiftLeft      ; Shift cursor line left
            Ret          ; and return

;      Transfer Line on Screen to Keyboard Buffer
;

```

(Figure 2 continues)

## ■ PROGRAMMING/UTILITIES

```

TransferLine: Sub      CX,CX           ; Count characters in line
               Mov     DI,Offset KeyboardBuffer ; Place to store 'em
               Mov     [BufferPointer],DI   ; Save that address
               Cld     ; String direction forward

GetCharLoop:  Mov     AH,02h          ; Set Cursor at DX
               Int     10h             ; through BIOS
               Mov     AH,08h          ; Read Character & Attribute
               Int     10h             ; through BIOS
               Stosb              ; Save the character
               Inc     CX              ; Increment the counter
               Inc     DL              ; Increment the cursor column
               Cmp     DL,[MaxCharCol] ; See if at end of line yet
               Jbe     GetCharLoop    ; If not, continue
               Dec     DI              ; Points to end of string
               Mov     AL,' '          ; Character to search through
               Std     ; Searching backwards
               Repz   Scasb            ; Search for first non-blank
               Cld     ; Forward direction again
               Jz     SetBufferCount  ; If all blanks, skip down
               Inc     CL              ; Number of non-blanks
               Inc     DI              ; At last character
SetBufferCount: Inc     DI              ; After last character
               Mov     [BufferCounter],CL ; Save the character count
               Ret                ; Return from routine

;      Shift Line One Space Right (For Insert)
; -----
ShiftRight: Push    DX              ; Save original cursor
               Mov     DI,AX            ; Character to insert
ShiftRightLoop: Call   ReadAndWrite ; Read character and write
               Inc     DL              ; Kick up cursor column
               Cmp     DL,[MaxCharCol] ; Check if it's rightmost
               Jbe     ShiftRightLoop ; If not, keep going
               Pop     DX              ; Get back original cursor
               Ret                ; And return from routine

;      Shift Line One Space Left (For Delete)
; -----
ShiftLeft:  Mov     DI,0020h        ; Blank at end
               Mov     BL,DL            ; Save cursor column
               Mov     DL,[MaxCharCol] ; Set cursor to end of line
ShiftLeftLoop: Call   ReadAndWrite ; Read character and write

```

(Figure 2 continues)

NOW  
COMES  
WITH FREE  
PRINTER CABLE!



## The world's best selling monochrome graphics card for the IBM PC.

There are more Hercules<sup>™</sup> Graphics Cards in more IBM<sup>®</sup> PCs, XT<sup>®</sup>s and AT<sup>®</sup>s than any other monochrome graphics card in the world.

Over a quarter of a million demanding users around the world use a Hercules Graphics Card to improve the performance of their software.

### The Lotus<sup>®</sup> 1-2-3<sup>®</sup> Booster.

Consider Lotus 1-2-3. Hercules gives an off-the-shelf

copy of 1-2-3  
the highest  
resolution  
possible  
on an IBM

PC, XT or AT. More 1-2-3 users choose the Hercules Graphics Card to get crisper text and sharper graphics than any other monochrome graphics card.

And we bring the same performance to other integrated programs like Symphony, Framework<sup>™</sup>, and SuperCalc<sup>™</sup>.

But we don't stop there. The Hercules Graphics Card

improves all kinds of software.

Like Microsoft<sup>®</sup> Word, a word processor that enables you to display text with subscripts, superscripts and italics.

Or pfs: Graph, an easy-to-use business graphics program that converts your data into presentation quality graphs.

Or Microsoft<sup>®</sup> Flight Simulator, the high flying game for the overworked executive.

Or our own Graph X<sup>™</sup>, a library of graphics subroutines that eases graphics programming.

Or AutoCAD<sup>™</sup>, a computer aided design program that offers features normally associated with expensive CAD systems.

And we supply free software with each card

to do hi-res graphics using the PC's BASIC interpreter.

### State-Of-The-Art Hardware.

The Hercules Graphics Card gives you graphics resolution of 720h x 348v and a

parallel printer port. Our unique static RAM buffer provides sharp 9 x 14 characters and flicker-free scrolling. Our exclusive safety features help

prevent damage to your monitor.

State-of-the-art custom IC technology delivers unsurpassed reliability. Ordinary graphics cards use up to 30 ICs to do what one Hercules IC does. By using fewer parts, we reduce the possibility of component failure.

Which is one reason we warranty the Hercules Graphics Card for two years.

Unbeatable reliability.

Advanced technology. Proven by over a quarter of a million users. Why settle for anything less than Hercules?

Call 1-800-532-0600 Ext 400 for the name of a Hercules dealer nearest you and we'll rush you our free info kit.

**Hercules.**  
We're strong on graphics.

Address: 2550 Ninth St., Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063. Trademarks/Owners: Hercules, Graph X/Hercules; 1-2-3, Symphony/Lotus; IBM, XT, AT/IBM; Framework/Ashley-Tate; SuperCalc/Sorcin-IUS; Microsoft/Microsoft; pfs/Software Publ; AutoCAD/D/AutoDesk. Printer cable offer expires February 28, 1988. Good only in U.S.A., offer subject to change without notice.

# Add 13,770 data tracks

## Increase your drive's capacity 30 to 118

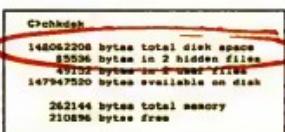
**MBytes** When you outgrow your XT or AT's original hard drive don't replace it. Make it bigger.

DiskMeld allows you to add an Emerald subsystem to your existing drive and use the combined capacity as a single large volume. And, DiskMeld doesn't cost extra—it's a standard feature on all Emerald hard disk subsystems. To take advantage of it you select the DiskMeld option from the installation menu. Period. Everything else is done for you.

## 236 megabytes in a

**single volume** Emerald subsystems are available in 30, 40, 55, 72 and 118 MByte capacities (formatted). Any of them can be combined with any of the others, or your existing drive to give you the capacity you need. Even two 118's. All can be used as a single large volume.

What does "single volume" mean? It

  
Actual printout of CHKHDISK on an Emerald 118 MByte (formatted) subsystem after DiskMeld was used to combine it with an existing 30 MByte drive.

means no 32 MByte "DOS Barrier." It means you can have one single file the size of your formatted disk's capacity. However, you don't have to use it as one volume. When the installation software asks how many volumes you want, enter any number up to 24. Then, type in the size you want each volume to be, even if one or more of them are larger than 32 MBytes.

**"The fastest of all the disks we tested...?"** Emerald hard disk subsystems are *FAST*. But don't take our word for it. *"This disk screams. The fastest of all the disks we tested, the Emerald PS550 was, without question, the most impressive of the lot..."* PC Week. Other industry publications feel the same way (see chart).

To build a subsystem that outperforms anything in its class, we start with the best

hard disks available. Control Data Corporation, for example, supplies us with disk drives that have Rotary Voice Coil Actuators, a dedicated take-off and landing zone and an average access time of 30 milliseconds or better. These drives are integrated into a complete subsystem that uses proprietary Emerald technology (which is 100% DOS compatible) to enhance the abilities and performance of the original disk.

## Dramatic improvement in average access time

The Emerald Disk Cache is a good example of our subsystem's performance enhancement. *"One important Emerald advantage is its own cache memory, which allows data to be stored in RAM for the fastest access possible."* PC Magazine.

You choose to use disk caching at the time of installation. If you elect to use it, you are prompted for the size of the cache. That's it. You never have to think about it again. It's always there, enhancing the total performance of the subsystem, automatically.

## XENIX and things you

**don't see** XENIX is "disk intensive"—the operating system alone takes up nearly 10 megabytes of space. Additional users quickly use all the space available in a typical 40 megabyte XENIX system on an AT. Some hard disk vendors can give you more than 40 MBytes of XENIX compatible storage, but they extract a hidden price—in order to use their drives with XENIX you must replace the ROM BIOS chip on the AT's motherboard with the vendor's BIOS chip. That voids the manufacturer's warranty on your AT.

Emerald subsystems provide up to 118 megabytes of high performance hard disk storage that is 100% compatible with the IBM ROM BIOS—absolutely no motherboard modifications are necessary. Instead of a hidden price, Emerald subsystems have a hidden ability—they provide XENIX System III and System V storage without compromising existing hardware, software, warranty or service agreements.



Create a configuration that meets the needs of your PC, XT, AT or compatible.

**Value added** We didn't stop with DiskMeld, incredible speed, password access, disk caching, the ability to "jump" the 32 megabyte DOS Barrier, DOS 2.X, 3.X and XENIX. Emerald hard disk subsystems also support the QNX operating system and a large number of networks such as Novell, PC/NET, 3 COM...

## Backing up on 1/4 inch tape

Emerald tape subsystems are designed and constructed to the same rigid standards as our hard disk subsystems. We start with the best tape drives available, then integrate them into a complete subsystem. In the case of our 1/4 inch tape cartridge drives, minimum acceptable requirements are the ability to accept data

## How DOS Sees Two 140 MB Drives

Drive X					Drive Y				
0	40	80	118	140	0	40	80	118	140
32 MB	32 MB	32 MB	22 MB	0	32 MB	32 MB	32 MB	22 MB	0

Standard Configuration

0	80	160	236	280
<b>One Volume</b>				
<b>236 MegaBytes</b>				

Emerald Configuration using the DiskMeld option of Extended Mass Storage Architecture.

Disk Overhead

DiskMeld combines the formatted capacities of two hard disks. Other Emerald features allow the drives to be configured as one large volume for use with IBM PCs, ATs and compatibles.

# to your AT's hard disk

at 5 megabytes per minute and consistency of operation.

Consistency of operation does not mean durability (that's a different requirement). It means that a cartridge written by one tape drive must be readable in an error free manner by a different drive.

Why is that important? The answer involves our disk subsystems. An important part of Emerald's Extended Mass Storage Architecture (EMSA) technology is our defect mapping technique. It permits our backup and restore software to check, and adjust to, the defect map of the drive it is writing to. Emerald users are shipping 100's of megabytes of data all over the world on our 1/4 inch tape cartridges—it is critical that each Emerald tape drive be able to read the tapes written by others, and that each Emerald hard disk subsystem accept that data, error free.

great speed and flexibility. It permits you to choose exactly what you wish to backup—everything on the physical disk, everything in a logical volume, a specified group of files, only files that were written after a specific time and date. ... ASP will even append data to a cartridge without destroying what's already there.

Best of all, it's FAST—up to 3 MBytes per minute in File-by-File and as fast as 5 MBytes per minute in the Streaming mode. (Actual speed varies, dependent on computer type, clock speed and the amount of RAM installed.)

## Network Compatible

Emerald cartridge tape subsystems provide full support for Novell Local Area Networks (LANs), including special files. That means you can backup and restore system, shareable, non-shareable, read-only, user rights

and directory access rights files. You can even perform on-line backup while users are logged on the network.

## True XENIX backup

XENIX has several commands built into it which are useful when backing up or restoring data. Emerald was the first (again) to announce a true XENIX backup in the 1/4 inch cartridge format—one which takes full advantage of XENIX commands such as "tar," "cpio" and "dd."

## Do I need two subsystems, one tape and one disk?

No. Although both are available in stand-alone configurations, we recommend that you get one subsystem to do it all—an Emerald disk/tape subsystem. But, whatever your needs, Emerald has a subsystem configured to meet them. Choose an internal subsystem, one that is external and portable or one that includes 6 expansion slots for your PC.



*Novell compatible cartridge tape subsystems support special files, user access rights, directory access rights and permit backup operations while users are logged on the network.*

## Emerald stays with you

Over 60% of the inquiries we get about our products are from referrals. One of the reasons for this is our one year limited warranty. Another reason for the phenomenal number of referrals is our "hand holding." We stay with you—through our technical support department, which is available 12 hours a day to assist you with problems.

Believe it or not, we even call you sometimes, just to see how things are going, or to ask what features you'd like to see in the next generation of Emerald products. Our products are loaded with value added features and benefits because we listen to our customers.

If you'd like to know more about Emerald, pick up the phone. One of our Applications Engineers will answer your questions, send you literature (including reprints of the articles quoted here), and refer you to an installed site in your area. Be sure to ask how you can add 13,770 data tracks to your existing hard disk.



**Emerald**  
Systems Corporation

Mainframe Storage for Micros

4757 Morena Boulevard  
San Diego, CA 92117  
U.S.A.  
(619) 270-1994  
Telex: 323458 EMERSYS  
Easylink: 62653804

Publication	Average Access Time	Comments
PC Week	25.26 ms	"This disk screams."
PC Mag	25.10 ms	"... outstanding performance."
PC Prod	24.71 ms	"... superior choice, ... lightning fast."
PC Week	26.30 ms	"—this one screams too."

*Independent tests by major publications all agree—Emerald subsystems are FAST.*

**Easy as 1-2-3** Archival Storage Protector (ASP), our backup and restore software, operates from a Lotus-like menu. Functions are on the top line and a description of the currently highlighted function is on the second line. You select functions by typing the first letter or using the cursor control keys. You backtrack or exit by using the Escape key. A continuously updated light bar graphically illustrates the percentage of backup completed.

Emerald's proprietary Qic-02 interface card has only four jumper switches for changing I/O address, DMA channels and interrupt levels are controlled from the keyboard via ASP.

The complete tape subsystem provides

## ■ PROGRAMMING/UTILITIES

```

Dec      DL          ; Kick down cursor column
Cmp      DL, BL      ; See if at original yet
Jge      ShiftLeftLoop ; If still higher, keep going
Inc      DL          ; Put cursor back to original
Ret      ; And return from routine

; Read and Write Character for Line Shifts
;

ReadAndWrite: Mov     AH, 2          ; Set Cursor from DX
                Int    10h          ; through BIOS
                Mov     AH, 08h        ; Read Character and Attribute
                Int    10h          ; through BIOS
                Xchg   AX, DI        ; Switch with previous char
                Mov     CX, 1          ; One character to write
                Mov     AH, 0Ah        ; Write character only
                Int    10h          ; through BIOS
                Ret      ; Return from Routine

; Initialization on Entry
;

Initialize: Sub    AX, AX          ; Make AX equal zero
             Mov    DS, AX          ; To point to vector segment
             Les    BX, dword ptr DS:[21h * 4]; Get and save Int. 21h
             Mov    Word Ptr CS:[OldInterrupt21], BX
             Mov    Word Ptr CS:[OldInterrupt21 + 2], ES
             Les    BX, dword ptr DS:[16h * 4]; Get and save Int. 16h
             Mov    Word Ptr CS:[OldInterrupt16], BX
             Mov    Word Ptr CS:[OldInterrupt16 + 2], ES
             Push   CS          ; Restore DS register
             Pop    DS          ; by setting to CS
             Mov    DX, Offset NewInterrupt21
             Mov    AX, 2521h        ; Set new Interrupt 21h
             Int    21h          ; through DOS
             Mov    DX, Offset NewInterrupt16
             Mov    AX, 2516h        ; Set new Interrupt 16h
             Int    21h          ; through DOS
             Mov    DX, Offset Initialize ; Number of bytes to stay
             Int    27h          ; Terminate & remain resident

CSEG
EndS
End    Entry

```

(Figure 2 ends)

*(continued from page 219)***CRUISING AROUND THE SCREEN**

Once DOS-EDIT is loaded (normally through your AUTOEXEC.BAT file), you can best understand its operation by thinking of your keyboard input as being in one of two separate modes. The normal mode works just as you're accustomed, and you won't know DOS-EDIT is even resident. But when you press the Cursor Up key you enter the full-screen mode and DOS-EDIT kicks into action.

While in full-screen mode, you can use the cursor keys to move the cursor to any part of the screen above the line from which you started. You are able to delete individual characters on the screen by pressing the Del key. The rest of the line to the right of the deleted character moves left. The Backspace key deletes the character to the left of the cursor and also moves the rest of the line left. The PgDn key deletes all characters from the cursor to the end of the line.

You can also type in regular characters while in full-screen mode. The typed characters will either overtype existing text or be inserted into the line. The Ins key switches between these actions. The program starts with insert off.

While in full-screen mode, the Home key moves the cursor horizontally to the original column position—the column the cursor was on when you entered full-screen mode—but keeps the cursor on the same line. The PgUp key moves the cursor horizontally to the first column position of the current line, all the way over to the left of the screen.

You can exit from the full-screen mode and return to the line you started from in one of four different ways. First, if you move the cursor down to the original line, the cursor will instantly jump back to its original position and you'll be out of full-screen mode. Second, if you press Esc while in full-screen mode, you'll exit full-screen mode with no changes made to your original line. Third, if you press End, DOS-EDIT will transfer all text from the cursor to the end of the line (except trailing blanks) to the original line and leave the cursor at the end of the original line. Fourth, pressing Enter does the same thing as End, except that it also enters the resultant command line.

**HOW DO I USE IT?**

The DOS-EDIT keystrokes may sound somewhat complex, but in actual use, you'll find them almost intuitive and simple to use. The Home key is the most important. Because Enter and End only move text that starts at the cursor position, you usually have to move the cursor to the beginning of the line, but not further left than the DOS prompt. Assuming you enter full-screen mode with the cursor just to the right of the DOS prompt, Home moves it back to that position.

A few examples will clarify the keystrokes:

(1) You entered a CD command but then realized you're on the wrong drive. To fix matters at this point, type in the correct drive, move the cursor up to the CD line, and press Enter. (If the length of your prompt changes when you change drives, you must position the cursor under the C in CD before pressing Enter.)

(2) You entered a long command but made a typing mistake. Move the cursor up to the line, correct the mistake (using the Del and Backspace keys and inserting characters as appropriate), press Home, and then Enter.

(3) You just did a DIR listing and you want to run one of the listed programs. Move the cursor up to the filename extension. Press PgDn to delete from the cursor to the end of the line. You can then enter any parameters, press PgUp to move the cursor to the left of the screen, and press Enter. Or, after deleting the filename extension, you can press PgUp to move the cursor to the beginning of the line, and End to transfer the line down to the command line without entering it. You may then enter the parameters and press Enter.

**A PROGRAMMER'S PROBLEM** I had originally wanted to make DOS-EDIT work in exactly the same way as the BASIC interpreter. That is, I wanted it to accept the entire line wherever the cursor was positioned on the line. This didn't seem like a big deal, but programmers often find that a task that at first appears straightforward can develop an ugly little hitch on closer examination.

The hitch in this case proved to be the DOS prompt. The DOS prompt is part of the line, but it is—inconveniently—a part

of the line that DOS-EDIT must ignore.

Why not just have DOS-EDIT ignore the first two characters on the line? No good. Most hard disk users I know use the PROMPT command with a \$Pg argument to display the current subdirectory, so their prompts are longer than two characters. OK, then, why not just have DOS-EDIT ignore everything to the left of the first angle bracket character? That might be fine for your prompt, but mine doesn't even end with a right-angle bracket.

The prompt problem was such a nuisance that I even went so far as to consider having DOS-EDIT look in the Environment area to get the actual prompt string so DOS-EDIT could know what it was and ignore it. But a resident program like DOS-EDIT gets only a static copy of the Environment when it's loaded. If you change the DOS prompt after DOS-EDIT is loaded, DOS-EDIT has no way of learning about the change.

That is why DOS-EDIT only transfers text from the cursor position on, and why I provided the Home key to move the cursor back to the original starting column. When people ask of a program, "Why does it do it this way?" and "Wouldn't it make more sense to do it that way?" there are often good reasons. In the case of DOS-EDIT, the prompt made me do it.

With this little lesson on programming compromises, we can now take a closer look at the internal workings of DOS-EDIT.

**IT'S ALL IN THE INTERRUPTS** For an assembly language program that needs to get a whole line of keyboard input, the DOS Interrupt 21h function call 0Ah (Buffered Keyboard Input) is often ideal. All the programmer has to do is set up an area in memory to receive the string of keyboard input, make the function call, and DOS does the rest. After the user presses Enter, DOS returns the final string back to the program.

Moreover, if the string is returned intact to DOS the next time keyboard input is needed, DOS uses that string as a template and allows the user to recall and edit the string with the DOS function keys. (Because function call 0Ah is susceptible to Ctrl-Break and skips to a new line when the Esc key is pressed, it is not often used

**COMPUTERS**

AT&T 6300 256K, 2 Dr. Mono	\$1699
440K, 1D, 10 MB, Mono	\$1999
NEW! SHARP 7000 Portable	\$1399
<b>CORONA</b>	
PC-400-27 W Monitor (20R)	\$1329
10 MB, Mono	\$1329
ALTO 865-25	\$6297
2586-2	\$15,199


**IBM**

PC 256K, 2 Dr.	\$1649
PC 256K, 1D, 10 MB	\$1999
PC 256K, 1D, 10 MB,	
10 MB Tape	\$2499
PC 256K, 1D, 20 MB,	
10 MB Tape	\$2599
XT 256K, 1D, 10 MB	
10 MB Tape	\$2799
XT 256K, 1D, 30 MB	
60 MB Tape	\$3599
AT 512K, 1D, 20 MB,	
60 MB Tape	\$4499
AT 512K, 1D, 60 MB	
60 MB Tape	\$5499

ITX XTRA-XP HI 512K, 10MB	\$2799
XTRA-2 256K, 2 Dr.	\$2799
XTRA-3 256K, 10 MB	\$1599

**NEC**

<b>NEC APC III</b>	
H1200 Mono 2 Dr	\$1499
H1200 Mono 2 Dr,	
Wordstar 1D, E/F 350	\$2050
H1212 1D, 20 MB Color	\$2179
H1212 w/AUTOCAD ABE3	\$4599

**PANASONIC**

SF Partner 256K, 2 Dr	\$1699
SF Partner 256K, 1D, 10 MB	\$1699
Executive Partner	\$1995

**WANG**

PC-PKS 2 Dr. IBM Emulation	\$2499
PC-PKS 1 Dr. 10 MB, IBM Emu	\$3536
WOR 120K, 1D, 120K	\$2799
APC EC268, 512K, 12 MB Dr	\$2799

**ZENITH**

ZF-148-42	\$1059
ZF-148-40	\$2899
ZF-158-52	\$17590

**PRINTERS**

C. ITOH All Models	\$1499
BROTHER/DYNAVAC	
HR-15XL/HM1509	\$3599/3999

**EPSON**

FX-85	\$345
LD-1500	\$879
JX-90 Color	\$2999

HEWLETT-Packard Laser J41	\$2499
PC-PK3	\$4997/7150
ELF-250	\$3999

OKI-ATA	
ML-182	\$218
ML-192	\$218
ML-193	\$489
PAINTER	
KX-TP091	\$245
KX-TP2131	\$269
QUINE SPRI01 140/150/170	\$269
SILVERBIRD EXP 500/550	\$250/418
STAR MICRONICS	
TOSHIBA 1340/341P/351P	\$429/925/1099

**HARD DISKS & TAPE BACKUP**
**INTERNAL HARD DISK KITS FOR PC/XT**

PRIMM 51MB/72MB	\$1445/1845
SEAGATE TANTON 10/20 MB	\$399/499/848

**INTERNAL HARD DISK KITS FOR IBM AT**

PRIMM 120/172 MB	\$1245/1445
SEAGATE 30MB (45MB).....	\$1799

**MOUNTAIN HARD CARD 20MB**

.....	\$899
-------	-------

**CPUS ALL MODELS**

SC486	\$249
SC486+MMX	\$249

**IBMW Tape Backup Systems**

Internal 10 MB/20 MB	\$499/799
External 10 MB/20 MB	\$999/1899

**TALLNESS TOS025**

SC486	\$1599
-------	--------

**PLOTTERS & DIGITIZERS**

CALCOMP 10400	\$7999
ENTER COMPUTING Six Shooter	\$799

**HOUSTON INSTRUMENTS**

TG 1011	\$659
TG 1111	\$6479

**TECHNICAL GRAPHICS**

SC486	\$1599
-------	--------

**ROLAND**

GX-101	\$436
GX-990	\$486

**E1020 AT Models**

SC486	\$249
-------	-------

**MITSUBISHI All Models**

SC486	\$149
-------	-------

**PRINTERGRAPHICS MAX 12E**

SC486	\$1175
-------	--------

**WX-13HGX 125K-15**

SC486	\$469/509/599
-------	---------------

**ROLAND**

ME-125/154	\$186
ME-142	\$269

**TAKAN 50-540**

SC486	\$469/535
-------	-----------

**NYSE**

NY-30/40/50/70/75	\$310/450/500
-------------------	---------------

**ZENITH ZVM-1220/ZVM-1230**

SC486	\$399
-------	-------

**QUME 1970**

SC486	\$399
-------	-------

**COMMUNICATIONS & NETWORK**
**NAYES**

Smartmodem 1200/2400	\$369/599
200Bx w/Smartlink	\$369

**INVENTION Smartlink Plus E1**

SC486	\$318
-------	-------

**PRENTICE POPCOM C100/X100**

SC486	\$149/265
-------	-----------

**PROMTHEUS Promodem 1200**

SC486	\$315
-------	-------

**NOVELL Networking**

SC486	\$149
-------	-------

**SOHN**

SC486	\$149
-------	-------

**ASHTON-TATE DBASE II**

Framework	\$369
-----------	-------

**HARVARD Total Project Manager**

SC486	\$255
-------	-------

**MICROSOFT WordPerfect 5.0**

SC486	\$225
-------	-------

**MULTIMATE**

SC486	\$229
-------	-------

**SSI WonderText v. 4.1**

SC486	\$225
-------	-------

**PC Write/Plan/Graph**

SC486	\$225
-------	-------

**GENTECH STANDARD**
**384K Multifunction Board OK**

SC486	\$159
-------	-------

**Hercules compatible video card**

SC486	\$149
-------	-------

**GEN TECH PC**

SC486	\$795
-------	-------

**IBM compatible 80486 system w/ 380K drive, Keyboard**

SC486	\$159
-------	-------

**HARDWARE**
**AST Six Pack Plus 64K**

SC486	\$219
-------	-------

**RUMBLEPAGE**

SC486	\$329
-------	-------

**PARADISE 5-PACK**

SC486	\$125
-------	-------

**QUADRA 5-PACK**

# YOUR BACK-UP SYSTEM FOR ADVANCED PC INFORMATION



As an IBM PC expert, you're the source of information on IBM PCs.

But when you need answers, where do you turn?

**TURN TO PC TECH JOURNAL** —you can depend on it every month for the most authoritative coverage of innovative applications, systems design, and technical information.

Save 47% off the single copy price of \$47.40.  
One year (12 issues) only \$24.97.

Use the coupon below, or call  
**1-800-852-5200**  
toll-free

82A44

**TECH JOURNAL** P.O. Box 2966  
Boulder, CO 80322

**YES!** I want to subscribe to PC TECH JOURNAL for one year (12 issues) for only \$24.97—nearly half off the one-year single copy price.

Mr./Mrs./Ms. \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Savings based on full one-year (12 issues) single copy price of \$47.40.

Check one:

Payment enclosed     Bill me later

Charge my:

American Express     Visa     MasterCard

Card No. \_\_\_\_\_

Exp. Date \_\_\_\_\_

Please allow 30 to 60 days for delivery of first issue

# Only NRI teaches you to service and repair all computers as you build your own 16-bit IBM-compatible micro

As computers move into offices and homes by the millions, the demand for trained computer service technicians surges forward. The Department of Labor estimates that computer service jobs will actually double in the next ten years—a faster growth than any other occupation.

## Total System Training

As an NRI student, you'll get total hands-on training as you actually build your own Sanyo 16-bit microcomputer system. You'll learn to assemble the hardware. Only a person who has learned all the underlying fundamentals can cope with all the significant brands of computers. And as an NRI graduate, you'll possess the up-to-the-minute combination of theory and practical experience that will lead you to success on the job.

You learn at your own convenience, in your own home, at your own comfortable pace. Without classroom pressures, without rigid night-school schedules, without wasted time. Your own personal NRI instructor and NRI's complete technical staff will answer your questions, give you guidance and special help whenever you may need it.

## The Exciting Sanyo 16-bit IBM-compatible Computer—Yours To Keep

Critics hail the new Sanyo as the "most intriguing" of all the IBM-PC compatible computers. It uses the same 8088 microprocessor as the IBM-PC and the MS-DOS operating system. So, you'll be able to choose thousands of off-the-shelf software programs to run on your completed Sanyo.

As you build the Sanyo from the keyboard up, you'll perform demonstrations and experiments that

Your NRI course includes a Sanyo 16-bit microcomputer system, monitor with diskette, keyboard, mouse, 3½" floppy disk drive, and 100-page catalog. "The NRI Discovery Lab," Teaching Circuit Design, Optical Components, Microprocessor, Bundled Spread Sheet and Word Processing Software, and more! Total cost \$1900. At Retail—\$4,000+ More.



NRI is the only home study school that guarantees you'll receive a top-brand computer system. You'll install and check keyboard, monitor, disk drive and memory step-by-step directions.

will give you a total mastery of computer operations and servicing techniques. You'll do programming in BASIC language. You'll prepare interfaces for peripherals such as printers and joysticks. Using utility programs, you'll check out 8088 functioning. And the entire system, including all the bundled software and extensive data manuals, is yours to keep as part of your training.

## 100-Page Free Catalog Tells More

Send the coupon today for NRI's big 100-page color catalog, which gives you all the facts about NRI training in Microcomputers, Robotics, Data Communications, TV/Video/Audio Servicing, and other growing high-tech career fields. If the coupon is missing write to NRI at 3939 Wisconsin Ave., NW, Washington, DC 20016.

IBM is a Registered Trademark of International Business Machines Corporation.

**NRI**

SCHOOLS

McGraw-Hill Continuing Education Center  
3939 Wisconsin Avenue, Washington, DC 20016

We'll give you tomorrow.

### CHECK ONE FREE CATALOG ONLY

- Computer Electronics with Microcomputers
- Data Communications
- Robotics & Industrial Controls
- Video Electronics Servicing
- Electronic Design Technology
- Digital Electronics

- Satellite Communications
- Communications Electronics
- Industrial Electronics
- Basic Electronics
- Telephone Servicing
- Small Engine Servicing
- Appliance Servicing

- Automotive Servicing
- Air Conditioning, Heating, Refrigeration, & Solar Technology
- Building Construction
- Locksmithing & Electronic Security

Name (Please Print)

Agt

Street

City/State/Zip

Accredited by the National Home Study Council

156-026

# Princeton Graphic Systems Number One Again

Sharp resolution, full compatibility, and rugged reliability. That's what you get in every Princeton Graphic Systems monitor. That's why Princeton Graphic Systems is number one in the minds of more and more personal computer owners every year.

Only Princeton Graphic Systems offers a complete family of quality personal computer

displays. Our color and monochrome monitors outperform the competition every time. That's why, for the second year in a row, our HX-12 high resolution color monitor has been voted best in the world.\*

So for the very best in personal computer monitors, pick the company that's number one. Princeton Graphic Systems.

\*PC WORLD Magazine's 1985 World Class Survey



**PRINCETON®**

GRAPHIC SYSTEMS  
AN INTELLIGENT SYSTEMS COMPANY

601 Ewing Street, Bldg. A, Princeton, NJ 08540, (609) 883-1860, Telex: 821402 PGSPRIN, (800) 221-1490 Ext. 702

CIRCLE 199 ON READER SERVICE CARD



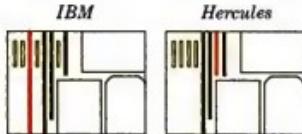
NOW  
COMES  
WITH FREE  
PRINTER CABLE!

## Why the Hercules Color Card is better for your XT than IBM's.

Did you know that there's a color graphics card specially designed for the XT™? It's called the Hercules® Color Card. We think that it's better for your XT than the IBM® Color Graphics Adapter. Here's why.

The XT comes with an empty short slot. IBM's card is too long to fit in it, so you're forced to sacrifice a valuable long slot, while your XT's short slot goes unused.

The Hercules Color Card is designed to fit in this short slot. It's the smartest way to maximize the usable slots in an XT and provide for your future expansion needs.



Notice how much more efficiently Hercules makes use of the XT's slots.

Our efficient use of an XT's slots is not the only reason to buy a Hercules Color Card instead of IBM's. We give you a parallel printer port at no extra cost. (IBM charges extra and takes up another slot.)

A lot of people wonder how Hercules can do everything that IBM can in a card less than half the size. We do it by designing our own graphics microchips. Just one of our chips packs the punch of dozens of IBM's, reducing by more than 50% the number of components that can fail.

And we'll do just about anything to make our products the most reliable you can buy.



Of course, you *will* have to give up something when you buy a Hercules Color Card. You'll have to give up software incompatibility. With Hercules, there is none. Every program that runs on the IBM color card will run on the Hercules Color Card.

You'll have to give up IBM's ninety day warranty. Ours is two years.

Compare warranties	
IBM	3 months
Hercules	2 years

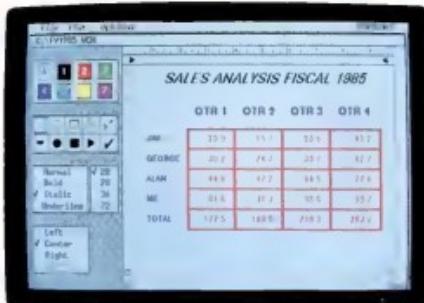
And you'll have to give up a dollar. The Hercules Color Card is \$245—IBM's is \$244.

Look into the Hercules Color Card for the XT, PC or AT. Find out why the readers of *PC World* voted the Hercules Color Card 1985's best color graphics card—ahead of IBM's. Call 1 800 532-0600 Ext. 420 for the name of the dealer nearest you and we'll rush you our free info kit.

**Hercules.**  
We're strong on graphics.

Address: 2550 Ninth St., Berkeley, CA 94710 Ph: 415 546-6000 Telex: 754063 Trademarks/Owners: Hercules/Hercules Computer Technology; IBM, XT, AT/IBM. Printer cable offer expires February 28, 1986. Good only in U.S.A., offer subject to change without notice.

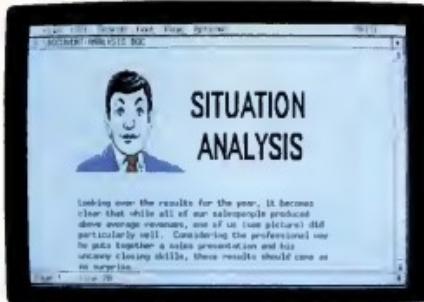
# How to chart, graph, write, draw, or paint yourself into a corner office.



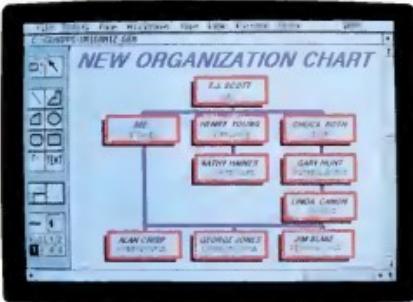
GEM WORDCHART™ (NEW): Create text presentation foils and slides quickly and easily. A variety of type styles and sizes. Up to 8 colors. Plus built-in bullets, borders and table layouts. Price: \$149.



GEM GRAPH™ (NEW): Powerful, easy-to-use graphing program. Create column, bar, line, symbol and map graphs. Built-in symbols and maps. Automatic 3-D and "pretty" functions give graphs professional polish. Price: \$249.



GEM COLLECTION™: Put words and pictures together in your reports and proposals. Words from GEM WRITE™, a fast, powerful word processor based on Volkswriter® Deluxe by Lifetree Software, Inc. Pictures, titles and diagrams from GEM PAINT™. Price: \$199.



GEM DRAW™: Now anybody can design layouts, charts, logos and more. Includes a wide variety of line styles, colors, type sizes and fill patterns. Plus rectangles, circles, arcs and polygons. Plus an extensive library of ready-to-use art. Price: \$249.

Screen color available only with IBM Enhanced Graphics Adapter and supported color monitor. Color output requires supported color output device. GEM, GEM COLLECTION, GEM DESKTOP, GEM DRAW, GEM GRAPH, GEM PAINT, GEM WRITE and GEM WORDCHART are trademarks and Digital Research is a registered trademark of Digital Research Inc. Other computer or software names are trademarks and/or tradenames of their respective manufacturers. Copyright © 1985 Digital Research Inc. All Rights Reserved.



This is what a career looks like when you present it with GEM™ software.

You see, with GEM you can put together a bold presentation of your bright ideas almost as fast as you can think them.

So, assuming you have a fair share of bright ideas, all you need now is a PC. And one or more of the GEM programs in this ad. Each of them works alone. Or they all work together.

Say, for instance, you're writing a report with GEM COLLECTION. You can use GEM GRAPH to add a telling graph to your report. Or you can embellish a GEM WORDCHART presentation foil with



an illustration from GEM DRAW.

And so on.

GEM software works with IBM® PCs, XT's, ATs and compatibles with appropriate graphics capability. Plus most any output device you can name, including the new laser and ink jet printers.

What's more, GEM software is now available for Tandy's Model 1000, 1200 and 2000 computers.

But best of all, GEM lets you work quickly and easily with simple menus, icons, windows and a mouse (or other compatible pointing device).

So instead of getting lost in cryptic computer

commands, you can spend your time getting ahead.

GEM software.

What better way to make your ideas perfectly clear? Or to clear a career path?

To place an order, or for the name of your GEM software dealer, call (800) 443-4200.

Charge your order to Visa, MasterCard or American Express.

Or mail this order form, along with your payment.



Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

— GEM COLLECTION \$199.00      — GEM DRAW \$249.00

— GEM GRAPH \$249.00      — GEM DESKTOP® \$ 49.95

Add \$10.00 for shipping and handling for each product ordered. Applicable sales or use tax will be added. C.O.D. checks or purchase orders will not be accepted.

(Outside USA add \$39.95)

\*GEM DESKTOP is included free with each GEM software product, or may be ordered separately as a stand-alone product.

Method of payment. Circle one: VISA MASTERCARD AM. EX. Card number \_\_\_\_\_

Exp. date \_\_\_\_\_

Signature \_\_\_\_\_

Mail to:  
GEM Software  
Digital Research Inc.  
60 Garden Court  
Monterey, CA 93942  
Or call (800) 443-4200.  
PC MAG 2/11

 **GEM**  
FROM DIGITAL RESEARCH®

# Now that we've saved your data, what else can we do for you?

By now, you probably know about The Norton Utilities™ with UnErase. You know, the program that actually searches for and retrieves lost data. No idle boast, and a pretty good thing to be famous for.

Problem is, UnErase is so popular, some of our other utilities just don't get the acclaim that they should. And there are some pretty nifty utilities in our package that we'd like you to know about.

For instance, you may have accumulated so much data on your disk, you've forgotten where you put it all. How do you organize your database so your information is manageable and accessible? First, List Directories gives you a list of all the directories and subdirectories on your disk. Then Disk Sort will sort all your directories five different ways. File Size gauges the amount of space your files occupy, to help you with transfers between disks and storage.

Sometimes you need to

track down a specific bit of data. It's not deleted, just mislaid. Search your directories to find the file by name with File Find. Or if you only remember a few identifying words of the file, Text Search will search your entire disk for those

words, including erased file space.

You can protect your data from harm with several of our other utilities. Disk Test will scan your disk for damaged sectors, unsafe for data. File Attribute makes your file invulnerable to alteration or deletion. Wipe File and Wipe Disk keep personal data confidential. Data is wiped clear by file or disk never to be retrieved. Not even with UnErase.

Are you an explorer at heart? Other utilities give you vital information about your system, a graphic map of your disk space, and let you scan your disk and snoop through programs.

Every day The Norton Utilities help you sort, track, explore and protect your

precious data. And should you lose something, UnErase is always there.

The Norton Utilities version 3.0 is designed for the IBM PC, PC-AT, and DOS compatibles. Available at Computerland and most software dealers. Order direct for \$99.95 from Peter Norton, 2210 Wilshire Boulevard, Santa Monica, CA 90403. 213-399-3948. Visa and Mastercard welcome.

## Find.

**NORTON UTILITIES**  
DATA RECOVERY  
DISK MANAGEMENT



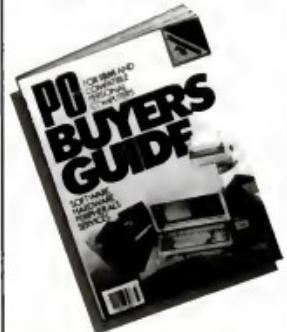
TIME-LIFE ACCESS NEWSLETTER says "Highly recommended for business users." VOLUME/SITE LICENSES AVAILABLE.

A life saver for your data.

CIRCLE 346 ON READER SERVICE CARD

PC MAGAZINE ■ FEBRUARY 11, 1986

## DO YOU KNOW THE 10,000 PRODUCTS AVAILABLE FOR YOUR IBM PC?



## Sort.

Whether you're adding-on a new printer, or in the market for new software, *PC BUYERS GUIDE* is your sourcebook to virtually every product available for IBM PCs and compatibles.

Updated and published every 90 days, *PC BUYERS GUIDE* lists over 10,000 products to help you purchase the equipment that meets your needs.

Order your copy of *PC BUYERS GUIDE* today!

### PC BUYERS GUIDE

Ziff-Davis Publishing Co.  
One Park Avenue — 4th Floor  
New York, NY 10016; K. Armstrong

Please send \_\_\_\_\_ copies of the latest edition of *PC BUYERS GUIDE*. Enclosed is my check or money order for \$9.45\* (\$7.95\* plus \$1.50 for postage and handling) for each copy. (Price outside U.S. \$11.00.)

Mr./Mrs./Ms. \_\_\_\_\_ (please print)

Address \_\_\_\_\_ AN36

City \_\_\_\_\_

State / Zip \_\_\_\_\_

\*Residents of CA, CO, CT, DC, FL, IL, MA, MI, MO, NJ, NY, State, and VT add applicable sales tax.

# THE ENCYCLOPEDIA OF INFORMATION FOR YOUR IBM PC

Taken one issue at a time, *PC* is the best source of up-to-date news and information about the IBM PC you can find anywhere.

But collect a few, and suddenly you realize that you've assembled a comprehensive reference work covering every significant new IBM PC application, product and development. *An encyclopedia you receive 22 times a year!*

Each volume of *PC* contributes the latest information on a wide variety of subjects including:

- **New Products** What's the latest in printers, word processing software and database managers? And what's best for your needs? Everything you need to know is in *PC*'s special reports and product reviews.

- **New Applications** Need to design a graphics presentation? Communicate with other PCs? Access a database? Find out how in *PC*'s expertly written articles.

- **New Developments** How are successful professionals and companies using their PCs? Find out in *PC*'s "Pro Columns" and use their proven techniques to move ahead in your own career.

*Subscribe to PC today.* Build your own IBM PC reference library by volume and save up to 50% off the regular one-year subscription price!

- One year (22 issues) only \$21.97. (Save 37%).
- Two years (44 issues) only \$34.97 (Save 50%).

To order, complete attached  
order card or call, toll-free,

**1-800-852-5200**



42478

# An 8 MHz Computer System . . . why buy less



That's right . . . why pay more money for less speed, less memory and less expansion power . . . when the Super XT Computer System will provide you with lots of speed (8 Megahertz), plenty of memory (640K, 20Mb hard w/2 floppy drives), more expansion power (8 expansion slots with 150 watt power supply) and is bundled together in a complete system package for . . .

#### Complete System Includes:

- 640K Internal Memory • 20 Megabyte Hard Disk
- 2 Floppy Disk Drives • Green or Amber Monitor\*
- RGB or Mono Graphic Card
- 150 Watt Power Supply
- 8 Expansion Slots • Serial Port
- Clock/Calendar • Parallel Port
- Game Port

# \$1995



AMERICAN DIGITAL  
DISCOUNT ASSOCIATION, INC.

4040 SPENCER STREET, SUITE M  
TORRANCE, CALIFORNIA 90503  
TELEPHONE: (213) 542-3578

\*Optional Color Monitor - add \$275.00

Super Computer, Inc. - Authorized VAR

CIRCLE 179 ON READER SERVICE CARD

■ EDITED BY JARED TAYLOR

# SPREADSHEET CLINIC

*This forum lets readers exchange the ingenious solutions and timesaving hints that make their spreadsheets and integrated software packages work better.*

## NUMLOCK REVISITED

You have run several submissions in your column from readers who have tried to solve the problem of entering 1-2-3 data with the numeric keypad without sacrificing the directional controls provided by the arrow keys. The best solution was Bill Taylor's macro in your August 6, 1985, column (Volume 4 Number 16), which I have reproduced as 'A' in Figure 1. When you run the macro, get into NumLock mode, type a number on the numeric keypad,

```
'A  (?) {down}/xg`\"
'B  (?) " {down}/xg`\"
'C  (?) -- {down}/xg`\"
```

Figure 1: A great macro (and two improved versions) that allows data entry on the keypad without loss of cursor control.

pad, and hit Return. The number will appear in the cell and the cursor will skip to the cell below, ready for the next number. It's great for entering a column of numbers, and you can put [right] in the macro instead of [down] if you need to enter a row of numbers. While the macro is still running, you can get out of NumLock and move freely around the spreadsheet. To enter more numbers, go back into NumLock. To end the macro, hit Ctrl-Break.

This is a great macro and one I have used for some time. However, while it is running, you can't use any 1-2-3 commands that end with a carriage return. By adding the tilde shown in macro 'B', you will build in the necessary carriage return, so you can then do such things as /Range

Erase, /Worksheet Insert Column, and /Worksheet Columnwidth Set while the macro is still running.

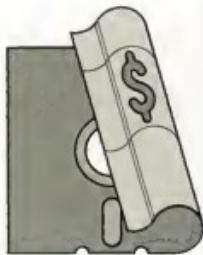
Macro 'C' takes the process one step further and lets you do a /Copy operation that requires two carriage returns. If you've been running 'C' in NumLock mode, get back into normal mode. Then move the cursor to a cell to which you would like to copy something. Hit /Copy and then Esc to free the cursor. Move the cursor to the cell with the contents you want to copy and hit Enter. The copy operation will work perfectly, and the cursor will return to the cell below the one into which the copy was made. The two carriage returns in macro 'C' do not slow down its operation, and it is the most flexible of the three.

Ronny Richardson  
Chamblee, Georgia

*These are, indeed, improvements over what I had thought was the last word on NumLock. I have found that you can also use macro 'C' to /Move as well as /Copy. Moreover, after you hit Esc to free the cursor, you can move it to the beginning of a range, anchor it with the Period key, and indicate the entire range to be copied or moved. Also, if the cell(s) you want to copy from are far off in the worksheet, you can type their coordinates after hitting Esc.*

## ENTERING DATES

In the Spreadsheet Clinic of November 12, 1985 (Volume 4 Number 23), you showed a method for entering dates in 1-2-3. In Figure 2, I have included two alternative methods.



/fd1"@@date(B6,{?})"
/fd2"@@date(B6,{?})" {down}

Figure 2: Two macros for entering dates.

put the cursor on the cell where you want a date and hit Alt-D. Type the numbers for the month and the day, separated by a comma, and hit Return. The date will appear in format 1. If you want a different format, change the number in the macro.

The second macro is a continuous loop that lets you enter dates in a column. After each date entry, the cursor moves to the cell below and waits for another date. To end the macro, hit Ctrl-Break. If you need to enter dates in a continuous row, just change {down} to {right}.

Robyne Vaughn  
Glenpool, Oklahoma

*These are both good macros, but I prefer a variant as follows:*

```
/fd1"@@date(B6,{?},{?})"
```

*With your macro, you type a comma and then hit Return to enter a date. With this macro you don't type the comma; you hit Return twice. I find it easier not to have to bounce back and forth between Return and the Comma key.*

## FINE PRINT WITH 1-2-3 AND SYMPHONY

If you have a printer that does subscript or superscript, you can probably use 1-2-3 and Symphony to do fine print. With an

## ■ SPREADSHEET CLINIC

Epson printer, the trick is to combine subscript and compressed modes and set the line spacing to  $\frac{1}{2}_{10}$  inch. The printer setup string '015@27SN0273015 will do the job. (All 0s are zeros.) If you have a different printer, you'll have to look up the control codes in the manual.

You can, of course, use fine print for anything you like, but I use it for RS-232 cable diagrams. What appears on the screen as Figure 3 will print out as Figure 4, which reproduces the exact size of the

/ppos[Esc]027@064\*qrAA4\*gg

To actually get 1-2-3 to send the reset code to the printer, you have to print a real print range, in this case cell AA4. Just be sure that the cell is blank.

Dan Lasley  
Memphis, Tennessee

### 1-2-3 SETUP STRINGS IN MACROS

If you write worksheet print macros that contain setup strings, you should be aware

well as page length and margins) to the default setting.

Robin Llewellyn  
Dallas, Texas

*For a belt-and-suspenders approach, just put 1 {Esc} at the beginning of any setup string in a macro. That will get rid of any string left over from a previous printing and make way for your string. The reason for the 1 (any character will do) is that if you begin the setup string with {Esc} and there is no remaining setup string, the Es-*

E	F
3 This cable connects two IBM PC's	IBM PC
4 together through two asynchronous	IBM PC
5 ports.	
6	1 -----
7 It is also useful in testing	2 -----
8 two async ports on the same	3 -----
9 system.	4 -----
10	5 -----
11	6 --
12	8 -- -----
13	7 -----
14	----- -- 6
15	20 ----- -- 8
16	
17	
	Female      Female

Figure 3: An RS-232 cable diagram as it appears on the screen.

This cable connects two IBM PC's		IBM PC	IBM PC
1	-----	1	
2	-----	2	
3	-----	3	
4	-----	4	
5	-----	5	
6	--		
7	-----	6	
8	-----	7	
9	-----	8	
10	-----	9	
11	-----	10	
12	-----	11	
13	-----	12	
14	-----	13	
15	-----	14	
16	-----	15	
17	-----	16	
		Female	Female

Figure 4: The actual size of the same cable diagram using fine print on the Epson printer.

printout. I have set up the diagram so that once it is printed, I can cut it out and glue it neatly on one side of the DB-25 cable cover. The comments fit on the other side. The diagram and label eliminate confusion and will give your cables a finished, professional appearance.

After a print job, the printer will still be in fine-print mode, so I use this macro to reset the printer to its default mode:

that 1-2-3 will keep the setup string in its print settings until you clear it. Thus, if you print the same worksheet twice using different setup strings, the second string will be tacked onto the first string rather than replacing it. This will result in an error and stop the print macro. Therefore, it's a good idea to use the /Clear Format command from the print menu before you end the macro. This will return the setup string (as

cape will take you back one level in the printer menu and sabotage your macro). The /I just gives you a setup string to clear if one didn't get left behind. If there is a leftover setup string, you'll just be adding it to a string you're going to get rid of anyway. And you don't even have to worry that the leftover string might already be 39 characters long and not take the extra 1; 1-2-3 will just beep when you try to add the 1 and will then clear the string.

### BYPASSING SYMPHONY SECURITY

One of the nicer things about Symphony 1.0—or so I thought—was its security feature. There is a format option, Hidden, that lets you hide cell contents. The contents do not show up on the screen but will appear in the control panel when you move the cursor to them. If you go to the settings menu and "lock" the spreadsheet with a password, the contents of the hidden cells will no longer appear in the control panel

## ■ SPREADSHEET CLINIC

either. You can /Save and /Retrieve the file normally, and you can look at all other cells, but you can't "unlock" and view the hidden cells unless you are able to give the password.

This sounds like very effective security, but, unfortunately, you can get around it very easily. All you have to do is combine a locked worksheet with another worksheet. From the services menu the thief need only follow this procedure:

```
File
Combine
Copy
Entire File
Ignore (line markers or
range names)
Values
Name of locked file
<Enter>
```

Hidden cells will still be hidden, but their contents will now show up in the control

### ■ The Hidden option hides cell contents so that they do not show up on screen but appear in the control panel when you move the cursor to them.

panel and you won't need a password to unhide them.

Niall MacDonagh  
Concord, New Hampshire

*This procedure works exactly as you say.  
Since file security is something of a cops*

and robbers game, I hope the readers of this column are cops rather than robbers. Fortunately, the problem has been solved in Symphony 1.1. When using this more recent version, if you try to /Combine a locked file, you will get a message saying it can't be done.

Frankly, I prefer the file security technique used in 1-2-3, Version 2.0. With this approach, you lock the entire file when you save it. That way, without the password, you won't even be able to read the file back into 1-2-3.

#### CONTRIBUTE TO THE CLINIC

Share your latest spreadsheet discovery through Spreadsheet Clinic. We'll pay you \$50 for anything we print, plus an extra \$25 if you submit it on a disk. If you send a disk, please include a printout.

Mail your contributions to Spreadsheet Clinic, PC Magazine, One Park Avenue, New York, NY 10016. ■



Order No. 5110C  
Pub. List \$26.50

More Good Reasons to Join the Computer Book Club

- **BIG SAVINGS.** Save 20% to 75% on books sure to increase your computer know-how
- **NO-RISK GUARANTEE.** All books returnable within 10 days without obligation
- **CLUB NEWS BULLETINS.** All about current selections—mains, alternates, extras—plus bonus offers. Comes 13 times a year with hundreds of up-to-the-minute titles to pick from
- **AUTOMATIC ORDER.** Do nothing, and the Main selection will be shipped automatically! But . . . if you want an Alternate selection—or no books at all—we'll follow your instructions.
- **BONUS BOOKS.** Immediately get Dividend Certificates with every book purchased, good for discounts of 60% to 80%.
- **EXCEPTIONAL QUALITY.** All books are first-rate publisher's editions.

**Yours for Only \$2.95**

when you join

**The Computer Book Club®**

*The Number 1 Book Source for IBM® PC Users*

- Saves you time and money
- Increases your productivity
- Helps you get ahead

**The Computer Book Club®**

P.O. Box 80, Blue Ridge Summit, PA 17214

Please accept my membership in The Computer Book Club and send my copy of *1001 Things to Do With Your IBM® PC* plus combination disk (5110C) billing me only \$2.95 plus shipping and handling charges. If not satisfied, I may return the book and disk within ten days without obligation and have my membership canceled. I agree to purchase 3 or more books at regular Club Prices (plus shipping/handling) during the next 12 months, and may resign any time thereafter.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

Valid for new members only. Foreign applicants will receive ordering instructions. Canada must remit in U.S. currency. This order subject to acceptance by The Computer Book Club.

IBM-266

# Buy Now and Continue To Save!

\*When you buy from us you become a preferred customer and receive all of our special pricing updates by mail. They're packed full of technical tips, product reviews, explosive bargains and great prices.

## Software

<b>Alpha Software</b>	
Electric Desk (PC)	\$209
ESP	499
Keywords	69
<b>Amaya</b>	
Tax Advantage	\$ 45
<b>Ashton-Tate</b>	
d-Base II	Call
d-Base III (v.1.1)	Call
Framework	Call
<b>Connecticut Software</b>	
Printer Boss (V.5)	\$ 99
Sideline	45
<b>Consumer Software</b>	
The Auditor	\$109
<b>Digital Research</b>	
Gem Graph	\$165
Gem Wordchart	110
Gem Draw (Incl. Desktop)	93
<b>Enertronics</b>	
Energraphics	\$209
Energraphics wPlotter	
Option	269

**Executive Systems-XTREME** \$ 40  
The neat features of this new program are: It gives a schematic of your directories, allows you to view files from any directory, it also gives disk statistics. (See our free offer in the hard disk drive section of this ad.)

<b>Fifth Generation</b>	
Fast Back XT	\$145
<b>Financial</b>	
Tax Series	\$ 55
<b>Fox &amp; Galler</b>	
Quick Report	\$159
Quickeys II or III	159
dGraph II or III	159
Passkey	35
Funk	
Sideways	\$ 49
<b>Hayes</b>	
Smartcom II	\$ 95
<b>Howardsoft</b>	
Tax Preparar 86 (for '85 tax yr.)	\$215
<b>Lilith Software</b>	
Volkswriter	
Scientific	\$299
Volkswriter Delux	155

<b>Living Videotext</b>	
Ready	\$ 69
Think Tank (256K)	119
Max Think	\$ 72
Mecs	
Managing Your Money	\$159
MicroPro	
WS ProPak (WS, CS, MM, SI)	\$255
Wordstar	175
Wordstar 2000	255
Wordstar 2000 +	295

**Microsoft Windows** \$ 69  
Can display any number of application programs on a screen and permits the user to alternate between unrelated programs without restarting the system.

<b>Microsoft</b>	
Quick Basic Comp.	\$ 69
Micro Assembler	99
Basic Micro Basic Compiler	269
Flight Simulator	39
Fortran Compiler	249
C Compiler	229
Chart	199
MuMath/MuSimp (DOS)	189
Pascal Compiler	199
Project	239
Multiplan (MS/DOS) (v.1.20)	129
Word (v.2.0) (DOS)	239

<b>Microfrost</b>	
CrossTalk (DOS)	\$ 99
CrossTalk (CPM)	139
Remote	119

<b>Multimate Systems, Inc.</b>	
Multi-Mate (V.3.0)	\$229
Advertising	454
Just Write	119
On File	111

<b>Peter Norton</b>	
Norton Util (V.3.0)	\$ 59
<b>Office Solutions</b>	
Office Writer	Call

<b>Open Systems</b>	
All Access Programs	\$339
Open for Business I	449
Open for Business II	759

<b>Rossoft</b>	
Prokey (V.4.0)	\$ 89
<b>Satellite Software</b>	
Word Perfect w/Sp.	\$239

<b>Personal Computer</b>	
Personal Word Perfect	119
Word Perfect Word Jr.	49

<b>Selcraft</b>	
Fancy Fonts (v.2.0)	\$135
Fancy Word	119

This is only a sample of the nearly 10,000 products we carry. If you're interested in something that is not listed, PLEASE CALL!

And don't forget to ask our sales people about our unadvertised specials.

**1 800 826-1589**

**1 800 472-3535**

INT'L TELEX: 260181 ORYX SYS WAU

Technical Support/Order Status/Customer Service:  
Call (715) 848-1374.

■ Indicates new products introduced in this ad.

<b>Software Publishing</b>	
(Jr. compatible) PFS: File, Graph, Plan, Write, Access	ea. \$ 75
Report	ea. 72
<b>Software Research</b>	
Smartkey	\$ 39
<b>Star Software</b>	
Star Partner	\$219
Acc'lg. Partner II	599
Upgrades @10% off	Call
<b>Sublogic</b>	
Jet	\$ 39
<b>Warner Software</b>	
(Jr. Compatible) Desk Organizer	\$ 63

**Zenith Cent.**  
1 serial, 1 parallel, RGB + composite output, with MS DOS and NEW Zenith ergonomic amber monitor. Complete for

Zenith LCD or lightweight portable, advanced PC (AT compatible) ... Call

**Dynax, Inc.** ... Call  
Epson LX 80 ... \$239  
LX 90 ... 239  
LQ 1000 ... 529  
LQ 1500 ... 938  
FX 286 NEW! ... Call

## Printers

**Okidata** ... Call  
182P ... \$239  
192P ... 389  
193P ... 550  
84P ... 699

**Okidata-183P** ... \$569  
The 183P is a wide carriage unit which operates at 160 cps in draft mode or 80 cps in emphasized mode. It also has a great looking NLO print at 40 cps.

**Quadram**  
**Quadjet** ... \$395  
Cables ... Call

## Computers

<b>IBM PC</b>	
256K, 2-360K floppy drives & keyboard	\$1599
<b>IBM PC Compatible</b>	
640K on Mother Board, 360K floppy dr, keyboard & 135W power supply	\$795
<b>IBM PC XT, AT</b>	
256K, 2-360K floppy drives & keyboard	\$1599
<b>IBM PC AT Compatible</b>	
640K on Mother board, 1.2MB floppy dr & HD cmtr cd, AT keyboard, 2 ser, 1 par port, C/V/Cal with battery backup all on Mother board	\$1895
<b>zSmith</b>	
Entry level PC (ZF-148), 2-360K floppy drives, 128K exp. to 768K, switch 5 MHz to 8 MHz,	

**FREE**

Receive a free copy of  
Executive Systems XTREE  
with the purchase of any hard  
disk drive (A retail value of \$49.95.)

# Hard Disk Drives

## Tape Back Up Systems

Alloy Computer Products  
PC Backup ..... \$1695

Ercal Stream 60  
Int. (AT only) (60MB) ..... \$899

Int. w/10W pwr sply  
(XT only) (60MB) ..... 969

Int. w/10W pwr sply  
(PC only) (50MB) ..... 999

Ext. (PC, XT, or AT)  
(60MB) ..... 1095

**AMT 286** 100% IBM PC AT compatible computer 6MHz or 8MHz (opt), 640KB memory, 8/I/O expansion slots, 80287 option, Floppy and Hard disk controller, 1.2MB disk drive, 20MB Hard disk, KB, all for \$1999<sup>99</sup>  
Limited offer.  
(Suggested retail \$3995)  
8 MHz Option \$50



### AMERICAN MICRO TECHNOLOGY

(714) 972-2945

TWX 5106003265

1322 East Edinger  
Santa Anna, California 92705

### IBM PC, XT, AT & COMPATIBLES at wholesale prices

**XT-PLUS** an IBM PC XT Compatible Computer 640K on Mother Board, Keyboard, Eight Slots, Floppy Controller, P/P, S/P, Clock, Game Port, Two Drives only \$699  
(Suggested Retail Price \$1399.)

Toshiba Drive 360KB . . . . .	79.00
1.2 MB Disk Drive for AT . . . . .	129.00
20MB Hard Drive w/Controller and Cables . . . . .	449.00
135 watt Power Supply . . . . .	79.00
195 watt Power Supply . . . . .	125.00
FDC with P/P, S/P, Clock & Game Port . . . . .	99.00
AT Mother Board . . . . .	899.00
XT Mother Board ("OK" expandable to 640K) . . . . .	125.00
Floppy/HD Controller for AT . . . . .	229.00

Dealers  
Wanted

**AMT**  
(714) 972-2945  
TWX 5106003265  
1322 East Edinger  
Santa Anna, California 92705

Ask for our  
Free Catalog

CIRCLE 507 ON READER SERVICE CARD

### Jr... My How You've Grown!



J&M Systems' PC2C disk controller allows you to add up to two external floppy drives to your PCjr, as well as our new hard drive! It is user-installed and replaces the IBM disk controller board.

Our floppy drive systems include the PC2C controller, cable, 360K drives, case, power supply, and software — everything you need! Prerequisite: DOS 2.1

PC2C controller and software ..... \$149

PC2C one-drive system ..... \$295

PC2C two-drive system ..... \$449

Our hard drives attach directly to our PC2C controller, or, with some modifications, to the original IBM board. The hard drive systems include a drive with case, power supply, cable, MS DOS driver, and host adaptor. (PC2C controller not included).

10 MByte system ..... \$750

20 MByte system ..... \$995

Visa and Mastercard accepted. Shipping extra.

15100A Central SE  
Albuquerque, NM 87123  
(505) 292-4182

CIRCLE 491 ON READER SERVICE CARD



### WHAT EVERY PC-USER SHOULD HAVE ACCESS TO!

The Public Domain SW library offers over 2500 User-Supported and fully documented software programs that run on MS-DOS & PC-DOS operating systems.

#### Special Selected programs:

LANGUAGE PROGRAMS — (Basic, Pascal, Fortch, etc.) \$32.00  
UTILITY PROGRAMS — (Unprotect Software, Assembler, etc.) \$20.00  
POPULAR GAMES — (Star Trek, B747, Apollo, Chess, etc.) \$24.00  
DATABASE MANAGEMENT — (PC File, DBMS Group, Mailist, etc.) \$36.00

- PC-CATALOG (with search & sort capability) \$7.00 + \$3.00 postage (on disk)
- SPECIAL: 5 disks that have been selected plus a FREE catalog disk.
- SI — Games, printspooler, music, communication, etc. \$35.00
- S2 — Games, databases, disk maint., graphics, etc. \$35.00

OVER 50 NEW DISKS HAVE BEEN ADDED SINCE OCTOBER:  
(over 1000 programs)

#### STOCK MARKET CHARTING (Great Program #133)

EDUCATION GAMES (#128)

PC-CALC (Visible spreadsheet) #124

PC-DIAL (MODEM Program) #126

HOST-CALL (Initiates & receives calls) #122

TIME & MGMT (Financial Calc, Budgets, etc.) #132

MUSICIAN (Write your own music) #123 PARTS INVENTORY (#137)

Membership \$15.00 1 year membership includes all Public Domain SW newsletters, diskette discounts, annual catalog update.

#### Public Domain SW

3080 Olcott St. #B-130

Santa Clara, CA 95054



Phone (408) 988-0230

(MC Visa welcome, min. CC \$14)

Shipping \$3.00 (Overseas \$10)

CIRCLE 528 ON READER SERVICE CARD

■ EDITED BY CRAIG L. STARK

# POWER USER

*Push your hardware and applications software to the limit by incorporating these productivity-enhancing tips from our readers.*

## TURBO RENAMING AND RESTRUCTURING

When I first got my copy of Turbo Pascal 3.0, I discovered that the Rename procedure can actually move files across subdirectories on a hard disk. With just a few lines of code, I wrote RESTRU.PAS. The program renames the first file on the command line to the second file while changing the directory name if necessary. In addition, it will even rename directories in DOS 3.0 or later.

Michael Toutonghi  
Seattle, Washington

*Mr. Toutonghi's RESTRU program (shown in Figure 1) is certainly one of the shortest useful Turbo Pascal programs I've seen. The Turbo Version 3 ParamStr function really comes in handy here. However, by relegating error handling to Turbo, you get some pretty ugly-looking messages if the program can't find the file or directory entry.*

*Neither of the two tasks RESTRU does—renaming directories and "restructuring" (shifting) files from one directory to another—is possible with the normal DOS REName command. Restructuring a file is like moving a file from one directory to another, but it's actually not a real move. The program simply changes the directory entry—which is all it has to do. Restructuring is a fast way of permanently getting a file from one directory into another without doing a COPY followed by an ERASE. It cannot move files from one disk to another, however.*

*Renaming subdirectories is often as im-*

*portant as renaming files, though how you do it has gone through some changes with the different DOS and BASIC versions. The DOS function call 56h, introduced with DOS 2.0 for renaming files, didn't work with subdirectories until DOS 3.0 came out. Since most programs written for DOS 2.0 (including the BASIC interpreter and the Turbo Pascal compiler) use that function call for renaming, they can't rename subdirectories under DOS 2.x.*

*Under DOS 3.0, the BASICA interpreter can rename subdirectories with the NAME command. For the brief period I used DOS 3.0, I used the batch file shown in Figure 2 for renaming directories. Using redirection of standard output, it creates a small file that contains a single BA-*

*SIC command. Then it runs BASICA using that file as standard input. I don't use it anymore, however, because BASICA 3.1 no longer allows using the NAME command to rename directories.*

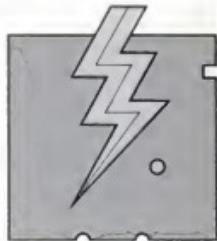
*Recently, I've been renaming subdirectories by using a short C program called NEWNAME (shown in Figure 3). It can be compiled with the Microsoft C Compiler, Version 3.0. The difference in executable code size between it and the Turbo Pascal program is interesting: RESTRU.COM is over 11K bytes long while NEWNAME.EXE is a little over 2K. Replacing the last cutps with the perror function increases the .EXE size by about 750 bytes but gives you more specific error messages.*

```
program restructure ;
{ Restructures files and
  renames subdirectories }
var filetochange : file ;
begin
  assign (filetochange, paramstr (1)) ;
  rename (filetochange, paramstr (2)) ;
end.
```

**Figure 1:** A Turbo Pascal, Version 3, program to "restructure" files from one directory to another and to rename subdirectories. Renaming subdirectories works only under DOS 3.x.

```
ECHO NAME "%1" AS "%2" >TEMP.TMP
BASIC <TEMP.TMP
DEL TEMP.TMP
```

**Figure 2:** RENDIR.BAT takes two arguments and renames the first to the second. It can rename subdirectories only under DOS 3.0 but can redirect files under DOS 2.0 and later.



## ■ POWER USER

```
/* NEWNAME.C -- Renames (or Restructures) Files and
   Directories */
main (argc,argv)
int    argc ;
char *argv [] ;
{
if (argc < 3) cputs ("Syntax: NEWNAME oldname newname") ;
else if (!rename (argv[2], argv[1])) ;
else cputs ("NEWNAME couldn't rename") ;
}
```

Figure 3: NEWNAME.C is a C program to rename subdirectories (under DOS 3.x) and restructure files. It can be compiled under Microsoft C, Version 3.0.

RESTRU.COM, RENDIR.BAT, and NEWNAME.EXE will renome subdirectories under DOS 3.0 and later and will "restructure" files from one directory to another under DOS 2.0 and later. None of the programs accept global filenames using the "\*" and "?" wildcard characters, however. While global filenames are not particularly useful for renaming directories, they can be important for restructuring.

The real workhorse for restructuring files is John Dickinson's RED program (PC Magazine, Volume 4 Number 4, page 245). RED (which stands for "redirect")

accepts global filenames for massive hard disk reorganization. Do not use the .ASM listing shown in the magazine, however—there were serious printing foul-ups. Instead, get the corrected .ASM listing either by modem from PC Magazine's Interactive Reader Service at (212) 696-0360 or send a self-addressed, stamped envelope to Technical Editor, PC Magazine, One Park Ave., New York, NY 10016.

The only thing missing so far is the ability to rename subdirectories under DOS 2.x. It's not impossible: you just have to go back to the old DOS function call 17h and

use an extended File Control Block. Figure 4 shows how you can use DEBUG to create a RENDIR.COM program that will rename subdirectories (but not do restructuring) under DOS 2.0 and later. The first argument must be an existing subdirectory in your current directory. You cannot use any backslashes in either parameter. The error message is a beep. [Another full-fledged RENDIR.COM utility by John Dickinson is scheduled for an upcoming Programming/Utilities column—Ed.] —Charles Petzold

#### SQUARE ROOTS IN DBASE REVISITED

In the November 12, 1985, Power User (PC Magazine, Volume 4 Number 23), a letter outlined a dBASE program for finding square roots. I may have missed something, but why didn't the writer simply use the "exponentiation" operator to find the square root (or any other root or power—including fractions)? For example:

```
H = 3
? H**1/2 (yields 1.73 as the square root)
H = 3.8888
? H**1/2 (yields 1.73265 as the square root)
```

Tony Long  
Schuylkill Haven, Pennsylvania

Part of the reason for including the SQRT.PRG identified above in Power User was that the program's origins were in Posco. It thus served to illustrate the kind of cross-programming possible between dBASE and other programming languages.

Mr. Long did miss at least a little. For one thing, use of the exponentiation operators is limited to dBASE III; dBASE II does not have these useful extro operators. Thus, for users of the latter the only way to get square roots easily is through a program like SQRT.PRG. (A dBASE III version of this program was included in keeping with our policy of accommodating differences between the two dBASE programs whenever possible.)

For another thing, however, Mr. Long's example is wrong. To find a square root in dBASE III, you would normally use the program's SQRT(?) operator (?) is the number whose root you're seeking). You can also use the \*\* operator followed by .5 to produce the same result. Howev-

```
A>DEBUG
-A
XXXX:0100 CLD          ; Forward
XXXX:0101 MOV SI,5C     ; Source string
XXXX:0104 MOV DI,126    ; Destination
XXXX:0107 MOV CX,1C     ; Number of bytes
XXXX:010A REP MOVSB     ; Move them
XXXX:010C MOV DX,11F    ; FCB Address
XXXX:010F MOV AH,17     ; Rename Call
XXXX:0111 INT 21        ; Call DOS
XXXX:0113 OR AL,AL     ; Check Error
XXXX:0115 JZ 11D         ; Exit if OK
XXXX:0117 MOV DL,7       ; Beep Code
XXXX:0119 MOV AH,2       ; Print Call
XXXX:011B INT 21        ; Call DOS
XXXX:011D INT 20        ; Exit
XXXX:011F
-E 11F FF 0 0 0 0 0 18
-N RENDIR.COM
-R .CX
CX 0000
:26
-W
Writing 0026 bytes
-Q
```

Figure 4: You can use DEBUG to create RENDIR.COM, a program that renames subdirectories under DOS 2.0 and later. You don't have to type the semicolons and comments.

er, using the fraction  $\frac{1}{2}$  only gives you one-half the number stored in N, not its square root.—David Obregon

### WORDSTAR AND EPSON ENHANCEMENTS

Getting true superscripts and subscripts to print on the Epson MX-80 under *WordStar* takes some work but is well worth it. To patch the WS.COM file, start by putting DEBUG in drive A: and a copy of the WS.COM file in drive B:. Type DEBUG B:WS.COM <Return>, and at the command prompt type:

```
F 775 L4 03 1B 53 00<Return>
F 77A L4 03 1B 53 31<Return>
F 789 L2 01 1B<Return>
F 76B L4 03 1B 2D 31<Return>
F 770 L4 03 1B 2D 00<Return>
W <Return>
Q <Return>
```

The first two patches (lines 2 and 3) will let you use 'PT for superscripts and 'PV for subscripts. Unfortunately, with the MX-80, using 'PT or 'PV to toggle the script mode off still leaves the line height in script mode.

The patch in line 4 helps solve this problem by letting you use 'PE to send an escape code to the printer. In this case, the command is 'PET, which is the Epson code for turning off script mode. You also have to add 'PEH, the code for turning off double-strike. 'PT or 'PV after the superscript or subscript is still necessary since *WordStar* treats this as a toggle that needs to be reset.

These patches do create one problem: If you use a super- or subscript on a line that contains underlining ('PS), everything after that line is thrown into a double-strike mode. However, I found that if you use continuous underlining, this problem dis-

appears. The patches on lines 5 and 6 redefine 'PA and 'PN so that 'PA will turn on continuous underlining and 'PN will turn it off.

Some special print modes create minor problems, as well. Emphasized print has precedence over the script mode and the script mode will not turn on. Double-strike causes increased fuzziness each time the script mode is invoked. So, turn off emphasized and double-strike just before the script mode and then turn them on again just afterward.

When typing in the justified mode, you must be careful of one thing. Any line containing a superscript or subscript will be two columns short of the right margin when printed. This occurs because *WordStar* counts the extra H and T (used with the 'PE) as characters even though the printer treats them as commands and does not print them.

## THE BEST PC TEXT EDITOR JUST GOT BETTER.

### ANNOUNCING SPF/PC™ 1.82

The best full screen editor for the IBM PC now extends support for large files to all PC's, not just the IBM/AT. Invoke your favorite program/compiler from within Edit at any time regardless of file size. CTC's SPF/PC™ 1.82 still looks like its mainframe cousin but executes faster with more options.

#### NEW FEATURES

- PAGING - Editing limited only by capacity of expanded/extended memory or hard disk.
- SPEED - Search 1,500,000 byte file with IBM AT in less than 13 seconds. By comparison, the IBM 3081 mainframe takes 48 seconds.

**\$195**  
UPGRADES only \$50  
ADD \$6 shipping  
Canada \$10, Foreign \$15



Payment in U.S. funds by check or bank wire (Bank of America, San Francisco account 05583-05454). Net 30 to D&B rated firms.

- Compatible with IBM and Novell Networks
- Modifiable HEX display
- Line length to 954 bytes

Minimum Requirements:  
DOS 2.00-3.10, 192KB memory,  
any IBM PC or true compatible  
or TI Professional.



Command Technology Corporation  
1900 Mountain Boulevard  
Oakland, California 94611

TO ORDER  
SPF/PC.....

Telephone: (415) 339-3530  
Telex: 509330 COMMAND TECH

CIRCLE 184 ON READER SERVICE CARD

#### ■ POWER USER

This route to super- and subscripts may not be elegant, but with practice or a *Pro-  
Key* macro, it works fine.

Virginia Shovlin  
Mentor, Ohio

I tested this out on my Centronics GLP, which is (theoretically) 100 percent compatible with the IBM Graphics printer, and I found a few minor differences in operation. With the GLP, the "PEH" after a super- or subscript is not necessary, making the commands a little neater. I also found that the super- or subscript would turn on during emphasized printing, though the print suffered from the same fuzziness as it does with double-strike. And with the "PS" in the same line as "PT" or "PV" on the GLP, everything after that line was thrown into script mode rather than double-strike. Despite the differences in problems, though, the solutions remained the same.

Also, you can cut down on keystrokes, avoid confusing WordStar's column count, make the screen neater, and eliminate the possibility of accidentally typing a lowercase *t* or *h* simply by putting the *Escape T Escape H* sequence on one of WordStar's four user-defined print commands.—M. David Stone

#### **KEYBOARD SCAN CODES FROM TURBO**

I've written a small procedure in Turbo Pascal to get keyboard scan codes using the BIOS Interrupt \$16 (hexadecimal). This is necessary for reading function keys or cursor movement keys. The demo program shows how to use it and prints out the character typed, the ASCII value of the character, and the keyboard scan code. When the ASCII code is zero, the scan code indicates an extended keyboard key, such as a function key. The extended key-

board codes are documented in the IBM PC Technical Reference manuals and Appendix G of the IBM BASIC manual (Appendix D in the manual for Version 3.0).

Andy J.S. Decepida  
Canada, Toronto  
Ontario

Normally, Turbo Pascal reads whole lines of keyboard input terminated with a carriage return. It echoes the line to the screen as you type it. Andy's routine (shown in Figure 5) is one way to write Turbo programs that avoid the normal Turbo keyboard input procedures.

*Another approach is shown in Figure 6. This is discussed in Appendix K of *Borland International's Turbo Pascal, Version 3.0*, reference manual, though it also works with Version 2. Reading from the KBD device gets unechoed and unbuffered keyboard input one character at a time. It*

**Precision Data Products**  
Complete Line of Quality  
Supplies for Your Computer

**TOLL FREE ORDER LINE**

**800-258-0028**

FOR INFORMATION CALL  
**616-452-3457**

**C.O.D.** 

 **COMPLETE LINE OF 3M DATA RECORDING PRODUCTS**

**DISKETTES**

5 1/4" SDDDRM	\$30.00 in Rebate Offers on Diskettes and Other 3M Products
DSDBRM	\$1.49
SSD 96TPI RH	\$1.49
DSDD 96TPI RH	\$2.37
"DS HD 96 TPI"	\$2.89
"SS Micro Diskette"	\$1.89
"DS Micro Diskette"	\$2.59

Sold 10/Box

**THE 100 FILE**

With Lock for  
100 5 1/4" diskettes

 \$12.95

**MINIMUM ORDER \$25.00. Add 10% for quantities less than 50.  
Prices subject to change without notice.  
Shipping and Handling \$4.00 per 100 diskettes. Reduced  
shipping charge for larger quantities.  
C.O.D. add \$4.00. MI residents add 4% sales tax.**

```

program scancode ;
var ch : char ;
    aascii, scan : byte ;
procedure getkb (var ch: char; var aascii, scan: byte) ;
type regpack = record
    ax,bx,cx,dx,bp,si,ds,es,flags : integer ;
end ;
var reg : regpack ;
begin
    reg.ax := 0 ;
    intr ($16, reg) ;
    aascii := lo (reg.ax) ;
    scan := hi (reg.ax) ;
    ch := char (aascii) ;
end ;
begin
repeat
    write ('Scan code demo (F10 to exit) --> ') ;
    getkb (ch, aascii, scan) ;
    writeln (ch, aascii: 4, scan: 4) ;
until scan = 68 ;
end.

```

**Figure 5:** A small routine in Turbo Pascal to get keyboard scan codes and extended keyboard codes. Getting these codes is necessary if your program must interpret the function and cursor keys and distinguish between keys that produce the same ASCII code.

handles the extended keys by returning the extended key code when it's called a second time. DOS function calls do the same thing by returning an ASCII zero as the first byte. However, Turbo replaces that zero with an escape code (ASCII 27). Because the escape can be generated by pressing the Esc key, you have to check for another key using the "keypressed" function before you fetch the extended key code. As you can see, it's definitely not as easy to use.

In cases where you have to differentiate between the PC's two Plus or two Minus keys (for instance), Andy's routine is also necessary. The ASCII codes are the same.

but the scan codes are different. Try out both routines to see the difference.

—Charles Petzold

#### SHARE YOUR POWER

Tell the world about your latest technical tips for hardware and software applications through Power User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout of your submission to ensure against damage in transit. Mail your contributions to Power User, PC Magazine, One Park Avenue, New York, New York 10016. ■

```

program readch ;
var ch, che : char ;
begin
repeat
    write ('Read(ch) demo ("C to exit) --> ') ;
    read (KBD, ch) ;
    if (ch = #27) and keypressed then begin
        read (KBD, che) ;
        writeln (ch, ord(ch): 4, ord(che): 4) ;
    end
    else writeln (ch, ord(ch): 4) ;
until FALSE ;
end.

```

**Figure 6:** This program represents an alternative approach to getting extended keyboard codes, using the Turbo Pascal "read" procedure. An ASCII escape code indicates that an extended code may be waiting.

## MAIL ORDER PC Add-Ons

Call Us Right Now  
for LOWER PRICE !!!

### HARD DISK

10MB Seagate	With Controller.....\$410
20MB Seagate	With Controller.....\$470
20MB Seagate for AT	(full height).....\$658
20MB Tandon	With Controller.....\$490
External 10/20MB	With Controller.....\$605/\$710

Includes power supply, cable & fan

32MB Tulin Drive	With Controller.....\$890
------------------	---------------------------

### BACK-UP SUB SYSTEMS

10MB Tape Back-Up.....\$390
20MB Cassette Back-Up

With Controller.....\$610

60MB Streaming Tape.....\$799
-------------------------------

### Hayes® Compatible Modems

300/1200 baud	Internal.....\$169
Half-size 300/1200 baud	Internal.....\$199

External Modem.....Call

### Multifunction Card

With 8K RAM.....\$109
With 384K RAM.....\$169

Serial Port, Parallel Port,
Game Port, Clock/Calendar
With Secondary Serial Port
and Memory Expandable
to 640K.....\$175

With Memory Expandable
to 3MB.....\$349

### Graphics Cards

Everex Graphics Edge....\$249
Everex The Edge.....\$259

Hercules Compatible
---------------------

Mono Graphics.....\$175
Hercules Color Card

(half-size).....\$165

You get 30 days money-back guarantee and full manufacturer's warranty on any of our products.

Call us Right Now.....

**408 - 946 - 0325**

**ELTECH Research, Inc**

318 S. Abel St., Milpitas, Ca 95035

CIRCLE 311 ON READER SERVICE CARD

# DATA SOURCES

## FOR DP PROFESSIONALS AND COMPUTER SPECIALISTS WHO PLAY IT SMART.

In the complex and ever-changing computer field, smart means knowing how to make the right product choices. Without wasting time and money.

Which means DATA SOURCES.

**DATA SOURCES** is a complete reference "factbook" of virtually every computer system and software package on the market. With product comparison charts that let you compare specifications and prices at a glance.

It's the only resource of its kind.

With **DATA SOURCES** you can make better, more intelligent comparisons—from the broadest range of possibilities—in minutes.

**Product Comparison Charts** make it easy for you to quickly compare an entire group of products of a similar nature. Each entry includes a page reference directing you to more comprehensive information.

**Hardware** including terminals, printers, controllers, memory devices and more.

**Data Communications** included in the Hardware volume, covering the full range of data comm products—communications, local area networks, virtually anything you require.

**DATA SOURCES** is published four times a year, so your information is always up-to-date. And it comes in two handy volumes—hardware and software. Tightly formatted and superbly organized, **DATA SOURCES** will give you a complete overview of more than 25,000 software packages, 18,000 hardware and data communications products, and profiles of more than 10,000 manufacturing companies.

To subscribe, call toll-free 1-800-443-0100, ext. 251.

We'll send you your first two-volume edition on a 30-day approval basis and enter your one year (four editions) subscription for just \$230—more than 24% off the regular price.

## DATA SOURCES

P.O. Box 5645,  
Cherry Hill, NJ. 08034

**Company Profiles** provide quick access to 10,000 hardware, software and data comm vendors.

### HIGH-END

MANUFACTURERS AND MODELS	MODE	SUBSYSTEMS	NAME
ALCYON	4D	MAIN	

MULTIPLEXORS/CONCENTRATORS	DATA COMM (CONTINUED)
	Rackmount □ 17,000 channel ends □ 1971

GENERAL DATA/COMM INDUSTRIES, INC.	DATA COMM (CONTINUED)
Company Profile located on page 244	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
APS Integrated Data Workstation	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
APS RMS Packaway	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
APX Extended Product	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1000	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1000E	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1000K	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-104%	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1072	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1082	

ALPHA MICRO SYSTEMS	DATA COMM (CONTINUED)
AM-1092	

GTE NETWORK SYSTEMS	DATA COMM (CONTINUED)
Its available at GTE Corp.	

### SOFTWARE PACKAGE INDEX

#### WORD PROCESSING—On-Line Software

International pg N-1050

WORD PROCESSING, Philips Information Systems Division pg N-1050

WORD PROCESSING, SMCB Computer Systems pg N-1054

WORD PROCESSING, Solvance pg N-1098

WORD PROCESSING, STATEWARE pg N-1098

WORD PROCESSING, STRATUS Computer pg N-1098

WORD PROCESSING, SYNTEX pg N-1098

WORD PROCESSING, TRW Plus pg N-1034

WORD PROCESSING, Weekend Business Systems pg N-708

WORD PROCESSING DICTIONARY, SYNTEX pg N-1098

WORD PROCESSING ENHANCEMENT, Informatics General pg N-1063

WORD PROCESSING IN SPANISH, Philips Group pg N-1044

WORD PROCESSING SYSTEM, Cromex pg N-1098

WORD PROCESSING SYSTEM, Modes pg N-1055

WORD PROCESSING/EIS/25, IBM pg N-1045

WORD PROCESSING/EIS/25, IBM pg N-1045

WORD PROCESSING/DATA CONVERSION, Multi-Mugshot pg N-1040

WORD PROCESSING/ELECTRONIC TYPEWRITER, Solvace Computer pg N-1060

WORD PROCESSOR, Convergent Technologies pg N-1098

WORD PROCESSOR, Dataspace pg N-109



# If you could get your investment information where Wall Street gets its investment information, you'd get it from us.

**CompuServe Information Services** put the most accurate, comprehensive investment information available at your fingertips.

**Now more than ever**, individual investors are joining the ranks of the most prestigious Wall Street firms who depend on CompuServe to provide them with a broad spectrum of comprehensive financial information for research, portfolio management and merger/acquisition strategies.

**Instant retrieval** of continuously updated quotes on over 10,000 issues and 10-years of daily historical pricing on over 50,000 securities.

**Standard & Poor's** descriptive information on more than 3,000 companies.

**Value Line Data Base II** extensive fundamental data to analyze the performance of more than 1,800 major corporations.

**Disclosure II** descriptive and financial information derived from SEC filings for over 8,500 companies.

**Institutional Broker's Estimate System** (I/B/E/S) earnings projections on over 2,800 widely followed companies.

**The World of Lotus** useful and timely information about Lotus products and services, including reference information about aftermarket Lotus related products and forums for 1-2-3, Symphony and Jazz maintained by Lotus.

**Reports** on technical market trends, personal portfolio evaluation and the most comprehensive analysis capabilities currently available.

You get all this plus demographic information on every zip code in the U.S., access to consultants through the Geneva Series, state of the art electronic communications, the full scope of the prestigious AP Wire Services, travel information and reservations and more of the high quality financial information that has made CompuServe

the premier supplier of investment information to the greatest names on Wall Street.

To buy a Subscription Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

Name _____
Address _____
City _____
State _____ Zip _____

  
**CompuServe®**

Information Services  
P.O. Box 20912  
5000 Arlington Centre Blvd.  
Columbus, Ohio 43220

**800-848-8199**  
In Ohio, Call 614-457-0802  
An H&R Block Company



## LETS YOU GET TODAY'S WORK DONE ... AND PLAN FOR TOMORROW



KnowledgeMan/2, the most advanced business software available, lets you be more productive than ever before and in less time. These powerful business capabilities, tightly fused into a single program, work together for you:

- Relational data management
- Spur-of-the-moment inquiry
- Spreadsheets
- Statistical analysis
- Forms management
- Programming language
- Options for creating graphs, processing text, generating reports, painting forms, mouse processing and remote communications.

KnowledgeMan/2's four user interfaces make it easy for you... and all your business people... to work with KnowledgeMan/2:

- Menus, help screens and easy-to-use documentation guide your every step, if you're just beginning.
- Direct commands for the power user, with help available when you want it.
- K-Chat, the optional natural language interface, for asking for information in plain English.
- Procedural programming for the advanced user.

Get KnowledgeMan/2 working for you today. And start planning for tomorrow.

KnowledgeMan/2 is available for IBM PC, XT, AT and compatibles with PC DOS, 16-bit micros with MSDOS or CP/M-86. Special versions are available for UNIX multi-user operating systems and IBM, 3Com and Novell Local Area Networks (LANs).

For the name of the KnowledgeMan/2 dealer near you, call or write Micro Data Base Systems, Inc./Marketing & Sales, P.O. Box 248, Lafayette, IN 47902, 317/463-2581, Telex 209147 ISE UR.



# A DEFINITIVE ENCYCLOPEDIA IS YOURS!

## SAVE UP TO 50%



**A**DD-ONS AND ADAPTOERS  
**B**USINESS APPLICATIONS  
**C**OMPARISON CHARTS  
**D**ATABASE DEVELOPMENTS  
**E**XPANSION CHARTS  
**F**INANCIAL PLANNING  
**G**RAPHICS INNOVATIONS  
**H**ARDWARE REVIEWS  
**I**NTEGRATED SOFTWARE  
**J**OB/BATCH FILES  
**K**EYBOARD OVERLAYS/TEMPLATES  
**L**OCAL AREA NETWORKS  
**M**OUSE INTERFACES  
**N**ORTON CHRONICLES  
**O**PERATING SYSTEMS  
**P**RICE WATERHOUSE REPORT  
**Q**UALITY CONTROL PROGRAMS  
**R**ECREATIONAL SOFTWARE  
**S**UPPORT SERVICES  
**T**UTORIALS FOR EXPANSION  
**U**SER-TO-USER TIPS  
**V**IDEO INTERFACES  
**W**ORD PROCESSOR EVALUATIONS

**X**T, AT, AND COMPATIBLE PCs  
**Y**ou can CALL TOLL FREE  
**1-800-852-5200** to subscribe  
to *PC Magazine*, a  
**Z**iff-Davis publication.

# AN AUTHORITATIVE



YES! I need a ready-reference to help me meet my professional PC needs. Please enter my subscription to *PC Magazine* for:

- One year (22 issues) for only \$21.97. A savings of 37%!  
 Two years for only \$34.97. I save 50%!  
 Payment Enclosed     Bill Me Later

Mr./Mrs./Ms.

(please print full name)

Company

Title

Address

City

State

Zip

Add \$15 per year outside USA, US currency only. Please allow up to 60 days for delivery of first issue.  
Savings based on one-year subscription price of \$34.97.

# INFORMATIVE!



YES! I need a ready-reference to help me meet my professional PC needs. Please enter my subscription to *PC Magazine* for:

- One year (22 issues) for only \$21.97. A savings of 37%!  
 Two years for only \$34.97. I save 50%!  
 Payment Enclosed     Bill Me Later

Mr./Mrs./Ms.

(please print full name)

Company

Title

Address

City

State

Zip

Add \$15 per year outside USA, US currency only. Please allow up to 60 days for delivery of first issue.  
Savings based on one-year subscription price of \$34.97.

# UP-TO-DATE!



YES! I need a ready-reference to help me meet my professional PC needs. Please enter my subscription to *PC Magazine* for:

- One year (22 issues) for only \$21.97. A savings of 37%!  
 Two years for only \$34.97. I save 50%!  
 Payment Enclosed     Bill Me Later

Mr./Mrs./Ms.

(please print full name)

Company

Title

Address

City

State

Zip

Add \$15 per year outside USA, US currency only. Please allow up to 60 days for delivery of first issue.  
Savings based on one-year subscription price of \$34.97.

**BUSINESS REPLY MAIL**

First Class   Permit No. 66   Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

First Class   Permit No. 66   Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

First Class   Permit No. 66   Boulder, Colorado

Postage will be paid by addressee



P.O. Box 2443  
Boulder, Colorado 80321

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



# YOUR PC ENCYCLO- PEDIA!



## PC Magazine—

The ultimate source of business and professional IBM PC applications—a virtual encyclopedia of information for PC users! The unbiased reviews, proven applications, and analytical evaluations in *PC Magazine* bring you the most comprehensive and accurate coverage available—22 times a year! Make sure you have a complete reference on-hand to help you meet your professional PC needs.

Subscribe to *PC Magazine* today!

■ EDITED BY PAUL SOMERSON



## USER-TO-USER

*PC Magazine's readers share their favorite tricks for getting the most horsepower out of DOS, BASIC, and their systems in general.*

#### **GLOBAL FILE CLEANING**

It's easy to fill up a hard disk with files that may no longer be needed. Since DOS doesn't let users delete files globally across subdirectories, I developed a utility called SCLEAN.COM (see Figure 1) that will search an entire hard disk for specific filenames (or wildcards) and allow me to erase or retain files selectively.

The syntax for using this utility is:

**SCLEAN [d:] filename**

SCLEAN will begin its search in the root directory and then scan any subdirectories that exist. Whenever a filename is found that matches the one you specify, SCLEAN will print out the filename and its path and then wait for you to enter a Y or an N. Choosing a Y will automatically delete the match, while choosing an N will leave it alone. If any other key is pressed, the question will be repeated.

With some simple changes, you can adapt the utility so it erases without showing you the matches one by one and without waiting for you to confirm each deletion, as though you typed in a true global erase command. I use this second version to delete any backup files I might create. You can create this second version by making three changes: Substitute a new name (such as GCLEAN.COM) in lines 230 and 270, change the Z#=34390! in line 150 to Z#=34205! and change lines 280 and 370 as shown in Figure 2. But be careful when using this, since it won't stop to verify your erase instructions.

Michael F. Roberts  
Snohomish, Washington

```
180 ' Program for creating SCLEAN.COM -- Michael F. Roberts
181 PRINT "Checking DATA statements; please wait..."
182 FOR B=1 TO 20:FOR C=1 TO 17:READ AS:IF C<17 THEN 140
183 Z#=Z#+VAL(AS)
184 NEXT:NEXT
185 IF Z#=3434981 THEN RESTORE:GOTO 170
186 PRINT "CHECKSUM ERROR -- CHECK TYPING AND REDO!":END
187 FOR B=1 TO 20:FOR C=1 TO 16:READ AS:TIL=TIL+VAL("4H"+AS)
188 NEXT
189 READ S:IF S=TTL THEN 220
190 PRINT "DATA ERROR IN LINE":B*10+270
191 PRINT "CHECK FIGURES AND REDO":END
192 TTL#=0:NEXT:RESTORE
193 OPEN "SCLEAN.COM" AS #1 LEN=1:FIELD #1,1 AS D$  

194 FOR B=1 TO 20:FOR C=1 TO 16
195 READ AS:LSET D$=CHR$(VAL("4H"+AS))
196 PUT #1:NEXT:READ DUMMY$N:NEXT:CLOSE
197 PRINT "SCLEAN.COM CREATED"
198 DATA EB,1F,98,44,65,6C,65,74,55,28,80,28,28,59,2F,4E,1323
199 DATA 29,3A,28,28,88,8A,8D,08,2A,2E,2A,88,88,88,88,3A,374
200 DATA 88,BF,88,08,88,1D,32,FF,C6,41,81,88,FC,47,88,CB,1721
201 DATA B8,20,F3,AE,E3,25,88,3D,88,75,87,8A,45,FF,47,EB,2028
202 DATA 88,98,B4,19,CD,21,4F,84,41,A2,1E,01,89,3E,1C,01,1664
203 DATA BA,1E,01,52,88,C2,82,52,B8,82,88,CD,20,55,88,EC,1636
204 DATA 83,EC,73,8B,D5,83,EA,71,BA,1A,CD,21,8B,1E,1C,01,1954
205 DATA E8,B8,00,33,C9,C4,4E,CD,21,72,43,BE,83,01,E8,A8,1894
206 DATA 88,0B,BD,83,EB,E3,58,EE,75,08,88,F2,EB,98,00,BE,08,21,27
207 DATA 01,EB,95,00,84,81,CD,21,8B,DB,8E,15,01,E8,89,00,1737
208 DATA 88,E3,DF,88,FB,59,74,87,80,FB,4E,74,8B,EB,CC,8B,2331
209 DATA D5,83,EA,4B,84,41,CD,21,B4,4F,CD,21,73,BB,BB,18,2137
210 DATA 81,EB,3A,88,89,18,88,B4,4E,CD,21,72,2B,88,7E,AD,1572
211 DATA 2E,74,1F,88,78,44,10,75,19,EB,1B,01,88,1F,00,52,1329
212 DATA 8B,D5,83,EA,53,52,E8,74,FF,88,D5,83,EA,71,BA,1A,2521
213 DATA CD,21,84,4F,CD,21,73,D5,88,85,5D,C2,84,88,88,FB,2114
214 DATA 83,EF,48,BD,78,BE,76,88,88,15,88,C6,85,5C,8B,76,1856
215 DATA 84,8E,8C,88,C6,85,5C,47,8B,F3,E8,83,00,88,85,C5,1567
216 DATA A8,AA,C8,74,83,AA,EB,F8,C3,B4,82,8A,14,8A,D2,74,2017
217 DATA 85,CD,21,46,EB,PF,C5,00,00,00,00,00,00,00,00,00,00,988
```

**Figure 1: SCLEAN.BAS program to create SCLEAN.COM utility that will allow you to make selective global file deletions across subdirectories. This version will ask for file-by-file delete verifications; to adapt it to erase globally without verification, make the three changes described in the text.**

# Only Toshiba printers combine the beauty of the daisy with the speed of the dot.



*Graphic and this type  
printed on a Toshiba  
3-in-One printer.*

## The Toshiba 3-in-One™ printers.

Toshiba's 3-in-One printers are the IBM PC-compatible printers that give you the best of everything.

Because their 24-pin printhead gives you beautiful letter-quality type like a daisy. Combined with the quiet speed and perfect graphics of the matrix.

In the world of business printers this combination makes Toshiba the leader in the letter-quality matrix category. And our 3-in-One printers a breed apart. So your printouts stand apart from the crowd.

Toshiba's 3-in-One 136-column printers also give you both downloadable type fonts and plug-in type font cartridges for an almost unlimited number of ways to express yourself.

For more information, call 1-800-457-7777, Operator 32. And tell us you'd like to see the beauty of the daisy and the speed of the dot.



In Touch with Tomorrow

# TOSHIBA

TOSHIBA AMERICA INC., Foothill Ranch, California

CIRCLE 119 ON READER SERVICE CARD

## ■ USER-TO-USER

```
288 DATA EB,1F,98,44,65,6C,65,74,65,28,00,8D,0A,00,2F,4E,1185
378 DATA 01,E8,95,00,B4,01,EB,17,98,98,BE,15,01,E8,89,00,1698
```

**Figure 2:** For a global eraser, substitute these two DATA statements in Figure 1, change Z# in line 150 to 34205!, and change "GCLEAN.COM" in lines 230 and 270 to "GLEAN.COM".

A valuable utility indeed. The GCLEAN.COM version is a whole lot safer than GCLEAN.COM, since GCLEAN \*.\* could wipe out your entire hard disk (including the GCLEAN.COM file that did the damage) except for the subdirectory names themselves. If you do use GCLEAN, unless you're exceedingly careful, create batch files that do the actual work and prevent errant keystrokes from wreaking havoc. For instance, a batch file called BAK.BAT to delete .BAK files everywhere on your hard disk would contain the line

```
GCLEAN *.BAK
```

### BATCH LINE SKIPPER

The DOS 3.1 COMMAND.COM patch to skip a line in a batch file with the ECHO + space + space construction (User-to-User, Volume 4 Number 24) is useful only when running a batch file on a system that has the patched COMMAND.COM.

Developers and anyone else who distributes batch files need a way to skip lines in batch files on all systems. With ECHO OFF, the construction ECHO H (H means hold down the Ctrl key and hit the H key.) will skip a line using both DOS 2.1 and 3.1. To demonstrate this, create a batch file called LINE.BAT with these lines

```
ECHO OFF
ECHO This is line 1.
ECHO H
ECHO This is line 3.
```

To insert the Ctrl-H you will need an editor or word processor that is able to embed control characters. This can be done with WordStar by holding down the Ctrl key and typing PH. Using EDLIN this can be done by holding down the Ctrl key and typing VH.

Richard A. Secor  
Watertown, Massachusetts

The extended ASCII character set offers three blanks—CHR\$(0), CHR\$(32), and

CHR\$(255). CHR\$(32) is the conventional between-word space, while CHR\$(0) is a null and CHR\$(255) is a high-bit space. Following ECHO with either a CHR\$(0) or a CHR\$(255) will skip a line. Two other ways to create these line skippers are in BASIC and in DEBUG. WordStar lets you make the ECHO + CHR\$(255) (but not the CHR\$(0)) by holding down the Alt key, typing 255 on the number pad (not the top row), and then releasing the Alt key—if you do this, a ~ will appear. If you use DEBUG, type in the whole file using your word processor (or even the DOS COPY CON: facility) but put a single dummy character where the CHR\$(0) or CHR\$(255) goes. Then get into DEBUG and replace the dummy character with either a 0 for CHR\$(0) or an FF for CHR\$(255), or just follow ECHO with a period—and no intervening space.

### BASIC WINDOW

Since BASIC doesn't provide a convenient way to scroll part of a text screen, I wrote my own assembly language subroutine to do the trick (Figure 3). The routine can also rapidly blank out a window.

The routine loads into the array SCRL. Five parameters are passed to it—whether the window should scroll up or down and the four corners of the window. They must be passed in the order shown.

Hubert Bormann  
Lillian, Alabama

While this program doesn't check for numerical input errors and scrolls only a line at a time, it does work as advertised. One of its better uses is to blank an area of the screen rapidly without having to print a series of individual CHR\$(32) strings.

### RELESS REMs

Well-chosen remarks within a batch file can be very valuable in prompting a user to swap disks or to display a title or logo. However, it would be nice to eliminate the actual word REM from the display.

# The Toshiba P341 printer. The outstanding value in 3-in-One™ technology.

Dollar for dollar, nothing matches what our P341 can do for your office. Here's quality, versatility and expandability at an entry-level price. The Toshiba P341. The mid-range printer with features that are tops.

**Speed:** 72 characters per second—letter quality; 216 characters per second (12 cpi)—draft quality.

**Reliability:** In-use tests show the Toshiba 3-in-One printer can operate without fail for up to 5 years of normal workdays.

**Compatibility:** Toshiba's 3-in-One printers are compatible with major software packages.

**Interchangeability:** Our parallel and serial interfaces make the 3-in-One series compatible with all micros. Today—and tomorrow.



In Touch with Tomorrow

**TOSHIBA**

CIRCLE 107 ON READER SERVICE CARD

## ■ USER-TO-USER

```

180 'SCROLL.BAS -- by Hubert Borrman
181 DEFINT A-Z:SCREEN 8:WIDTH 88:CLS:dim SCRL$(34)
182 FOR X=8 TO 33:READ Z$:SCRL(X)=VAL("4H"+Z$):NEXT
183 PRINT "Want window cleared (Y/N)?";
184 IS=INKEY$:IF IS="" THEN 140 ELSE CLS
185 IF IS="Y" OR IS="y" THEN SCRL(29)=#HE788
186 FOR X=65 TO 87:PRINT STRING$(88,X);:NEXT
187 LOCATE 25,23:PRINT;"Up or down (U/D) -- or Esc to end:";
188 IS=INKEY$:IF IS="" THEN 188 ELSE IF IS=CHR$(27) THEN END
189 IF INSTR("UDd",IS)=8 THEN BEEP:GOTO 188 ELSE GOSUB 268
200 LOCATE 25,38:INPUT;"Enter top row: ",TOP:GOSUB 268
210 LOCATE 25,38:INPUT;"Enter bottom row: ",BOT:GOSUB 268
220 LOCATE 25,38:INPUT;"Enter left column: ",LEF:GOSUB 268
230 LOCATE 25,38:INPUT;"Enter right column: ",RHT
240 DEF SEG:SCROLL = VARPTR(SCRL(8))
250 CALL SCROLL (UD$,TOP,BOT,LEF,RHT):GOSUB 268:GOTO 178
260 LOCATE 25,23:PRINT STRING$(48,32):RETURN
270 DATA 8B55,8BBC,865E,178A,5E8B,8A08,880F
280 DATA 8A5E,378A,5E8B,8ABC,FE2F,FECA,FE9
290 DATA FECE,8BCD,8E76,6C8B,8A81,8866,FC88
300 DATA 7455,880A,75PC,8574,8784,83EB,B498
310 DATA B886,B781,CD87,5D18,8ACA,8800

```

Figure 3: SCROLL.BAS routine for scrolling or blanking a window in BASIC.

Is there an  
XEDIT  
compatible editor for  
your IBM PC?  
Yes. KEDIT.

- Most XEDIT commands and features
- XEDIT fullscreen layout
- Multiple files
- Splitscreen editing
- Redefinable keys
- Enhanced block operations
- DOS command interface
- And much, much more

XEDIT is IBM's powerful fullscreen editor for VM/CMS

**Mansfield Software Group**

Box 532  
Shorts, CT 06268  
203-429-8402

\$125 plus \$3 shipping  
Demo Version \$10  
MC, VISA, COD, PO, check

CIRCLE 364 ON READER SERVICE CARD

This is simple to do. The trick is to place a string of backspaces (CHR\$(8)) at the beginning of the remark line. You can't do this when using the DOS COPY CON: batch creation method, since DOS uses the Backspace key for making corrections. But any word processor that allows embedded control codes makes it easy.

In the following REMLESS.BAT example, the first remark will be preceded by a REM, while the second won't. (Each backspace here appears as a lower-case h.)

```

CLS
REM this is a remark
REMhhnthis is a REMLESS remark

```

You can also use this technique along with SideKick's ability to enter and edit the upper 128 ASCII graphics symbols to create attractive titles.

Ethan Winer  
East Norwalk, Connecticut

**A VISIBLE  
SALES  
STRATEGY**

A classified ad  
in PC means a mini-investment with a high sales  
return in the microcomputer mail-order  
market! Let us give you information on ad  
sizes, options, rates—and you'll be amazed  
at how economically you can focus in on  
your specific audience.

PC's penetrating editorial brings you a  
knowledgeable readership that is rapidly  
growing—and growing increasingly receptive  
to the product or service you have to offer.  
And it's easier than ever to deliver your  
message—because you can phone your ad  
in or the number below, so your insertion can  
run in the next issue. Make sure it does—  
phone now!

**Classified Advertising**  
**ZIFF-DAVIS PUBLISHING COMPANY**  
Computer  
Publications  
Division

**CALL 212-503-5115**

## ■ USER-TO-USER

While this will eliminate the problem of displaying REMs, it's just as easy to start your batch files with ECHO OFF and then ECHO comments. If you have a word processor such as SideKick or WordStar that lets you embed control characters, you can create each backspace in REMLESS.BAT by typing Ctrl-PH (they'll show up as 'Hs). Otherwise, run the REMLESS.BAS program in Figure 4.

### UNDOCUMENTATION

While a hard disk's tree-structured directory system is very helpful, it can be very discouraging to get deep into a directory that has many subdirectories and then try to back out to the previous one.

If you are logged into a subdirectory called \D1\D2\D3\D4\5 and you want to get to \D1\D2\D3\4, you could type

```
CD \D1\D2\D3\4
```

```
100 ' REMLESS.BAS -- creates REMLESS.BAT test batchfile
110 REM "remless.bat" FOR OUTPUT AS #1
120 PRINT #1,"CLS"
130 PRINT #1,"REM this is a remark"
140 PRINT #1,"REM";STRING$(3,8);"this is a REMless remark"
150 CLOSE:END
```

**Figure 4:** Program to create REMLESS.BAT batch file to illustrate technique of preventing REMs from displaying in batch files.

But there is an undocumented trick that will step you back one subdirectory at a time—just type

```
CD ..
```

Randy Dudley  
Sevierville, Tennessee

This technique has been written about so much and used for so long that many users know about it already and probably think it's in the current documentation, but it's not. The DOS manual does say that you

can see what files are in the parent (higher) directory by typing DIR... but doesn't mention the use of the double dot in moving upward through your subdirectories toward the root.

IBM pictures its tree-structured directories upside-down, with the roots at the top and the branches spreading down. When IBM uses the term downward, it means away from the root; upward means toward the root. To move downward, type CD and the name of the next lower subdi-

<b>"A Complete Accounting System For Your Specific Industry"</b>		<b>\$49.95</b>	
		TO ORDER CALL: (IN PA) 1-800-551-ROSE (OUT OF PA) 1-800-553-ROSE FOR MORE INFO. 215-443-7028	
<b>GENERAL SYSTEM</b> INVOICING ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY PURCHASE ORDER GENERAL LEDGER <b>\$49.95</b>		<b>CONSTRUCTION</b> JOB COST ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY BID PREPARATION GENERAL LEDGER <b>\$49.95</b>	
<b>PROFESSIONAL</b> TIME BILLING ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY MAIL LIST MGMT GENERAL LEDGER <b>\$49.95</b>		<b>MANUFACTURING</b> JOB TRACKING ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY BID PREPARATION GENERAL LEDGER <b>\$49.95</b>	
		<b>RETAIL SALES</b> DROP SHIP PURCHASES ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY MAIL LIST MGMT GENERAL LEDGER <b>\$49.95</b>	
		<b>EQUIPMENT RENTAL</b> RENTAL BILLING ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY 3RD PARTY BILLING MAIL LIST MGMT GENERAL LEDGER <b>\$49.95</b>	
		<b>WHOLESALE SALES</b> DROP SHIP PURCHASES ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY ORDER ENTRY MAIL LIST MGMT GENERAL LEDGER <b>\$49.95</b>	
		<b>MEDICAL BILLING</b> 3RD PARTY BILLING ACCTS RECEIVABLE ACCTS PAYABLE PAYROLL INVENTORY MAIL LIST MGMT PATIENT HISTORY GENERAL LEDGER <b>\$49.95</b>	
<b>ROSE ASSOCIATES</b> <b>2005 FAIR OAKS AVE.</b> <b>HATBORO, PA 19040</b>			
NAME _____ ADDRESS _____ CITY _____ STATE _____ ZIP _____ MONEY ORDER _____ VISA _____ MC _____ EXP. DATE _____ CARD # _____  COMPUTER TYPE _____ DISK TYPE _____ SYSTEM DESIRED _____			
<small>INCLUDES STAMP FOR POSTAGE &amp; HANDLING PA RESIDENTS ADD 5% SALES TAX FOR MORE INFO. CALL 215-443-7028</small>			

CIRCLE 115 ON READER SERVICE CARD

# LETRIX™ Improves PC Printing

With LETTRIX™ your IBM ProPrinter, Epson, OKidata, IBM Graphics, Star Gemini, or Panasonic printer can print proportionally-spaced and microjustified letter-quality text directly from all software. This ad is an actual-size photograph of text printed by a word-processor on an Epson FX controlled by LETTRIX™.

---

Before: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
After: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

---

Unlike Font, Print, or Paint programs, LETTRIX™ does not require you to create a separate file or use special commands. Rather, it resides in your PC's memory between your software and printer, responding automatically to spacing, paging, margins, boldfacing, underlining, italics, subscripts and superscripts.

---

"*Lettrix belongs in your software library. It produces output that is really quite remarkable. Lettrix is also extremely easy to use. Even the program's documentation is a pleasure.*" - Vincent Puglia, PC Magazine 12/10/85  
"The top of its class." - R. Geist, PC Products 8/85

---

You can design your own characters on any display, or use the twenty different typefaces included: Broadway, Courier, Old English, Art Deco, BUTLINE, BUERELLE, Engraved, Paul Avenue, WESTERN, SHAW, Roman, BANKER, Gothic, Prestige, Folio, ORATOR, OCR-A, and the entire IBM foreign language and line-drawing character set:

$$\sum_{n=1}^{\infty} \frac{(\mu+B)}{6.718} \approx \int_1^{\infty} \left[ \frac{\partial^3 u}{\partial t^3} + u \frac{\partial u}{\partial x} \right] + \frac{Ax+\bar{Q}}{\sigma\mu/\Omega}$$

Français, Español, Русский, and Ελληνικός.

---

You can change the typeface and size by accessing a menu that pops-up over your current software, or by placing simple single-character commands in your text.

---

For fastest delivery, charge LETTRIX to your VISA or MasterCard by dialing (800) 351-4500. LETTRIX™ costs just \$98.50. We pay UPS shipping.

Call and mention this magazine for a free print sample. SIXTY-DAY MONEY-BACK GUARANTEE. NOT COPY-PROTECTED.

---

LETTRIX requires an IBM PC, XT, AT, or compatible with 50kb of free memory, and DOS version 2.0 or greater.

---

HAMMERLAB CORPORATION 5700 ARLINGTON AVENUE  
(203) 776-5699 RIVERDALE, NEW YORK 10471

CIRCLE 303 ON READER SERVICE CARD

## PRODUCTIVITY

### ■ USER-TO-USER

---

■ IBM pictures its tree-structured directories upside-down, with the roots at the top.

---

rectory—without a backslash. To move upward, type

CD ..

(This works only until you reach the level directly below the root directory—try it in the root and all you'll get is an "Invalid directory" message.) So if you're logged into \D1\D2\D3 and want to move to \D1\D2\D3\D4, just type

CD D4

You couldn't get to the same place with

CD \D4

since DOS would think you wanted to get to a directory called \D4 that was just one level down from the root. The reason for the confusion is that in the above case you're really not trying to get to a subdirectory called \D4; the full name of the desired subdirectory is \D1\D2\D3\D4. You need the full path before every subdirectory. But to get from \D1\D2\D3 to \D1\D2\D3\D4 all you type is

CD D4

Got it? Lots of users don't get it, because IBM's manuals didn't exactly make it easy. Once you read this explanation carefully and try it a few times you'll catch on, but for many novice users this is an inscrutable mess that prevents them from getting true organizational power out of their hard disks.

### SHARE YOUR DISCOVERIES

Tell the world about your latest discovery through User-to-User, and we'll pay you \$50, plus an extra \$25 if you submit it on a disk. Mail your contributions to User-to-User, PC Magazine, One Park Avenue, New York, NY 10016. ■

■ EDITED BY CHARLES PETZOLD

# PC TUTOR



*PC Tutor answers your questions on everything from programming and operating systems to hardware and applications software.*

## RESIDENT WARS

Almost every issue of *PC Magazine* contains yet another neat resident program I would like to use. I also use resident programs, such as *SideKick* and *ProKey*. Most of these resident programs examine keystrokes waiting for the special one that puts them into action. My first question is: How do they manage not to get in each other's way? Is there a limit to the number of such programs I can use at one time? Is there a preferred sequence to follow in loading these programs initially? Does having so many programs examining my keystrokes slow down processing?

My second question concerns a disk full of BASIC programs that I would like to print with as little effort as possible. If the programs were in ASCII format, I could just execute

PRINT \*.BAS

But they are not in ASCII. What's a smart way to print these files other than loading and listing them one at a time?

Michael Trombetta  
Manhasset, New York

*To take your first question first: Sometimes loading up a bunch of resident programs does create problems. Some resident programs are polite and some are not. Frankly, experimentation is the best way to find the crabby ones and what is the best loading sequence. (Often it doesn't matter.) Sometimes the program documentation may recommend loading a given resident program first or last, but other than that, you're on your own.*

*I have 10 resident programs that load everytime I boot up. (And if you think that's a lot, you should see Craig Stark's AUTOEXEC.BAT—it's one of the largest files on his hard disk!) Adding a new one is always an adventure—I recently wrote a "print screen to file" resident program that managed to interact with the DOS PRINT command in such a way that I could do a directory on a diskette drive with an open door without getting the "Abort, Retry, Ignore?" message. That program needs work.*

*Many resident programs are called into action by what is known as a "magic keystroke." To explain just how they work, I will have to start with the basics. Every time that you press a key on the keyboard, you initiate a hardware interrupt to the 8088 microprocessor called Interrupt 9. This interrupt forces the 8088 to execute a routine whose address is located in the 4 bytes at memory location 0000:0024 in lower memory. This is called the Interrupt 9 vector address.*

*When you first boot up, this vector address points to a routine in the ROM BIOS that decodes the keystrokes into ASCII codes. When a "magic keystroke" resident program loads, it gets this vector address from memory, saves it, and then substitutes an address that points to its own code. Thereafter, pressing a key causes the resident program to check the keystroke first. If it's not the magic keystroke, the program then branches to the address it saved when it loaded. (Usually the magic keystroke is something the ROM BIOS would ignore anyway.)*

*Each resident program that loads does the same thing. In theory, this is all nice and neat. The result is a long chain of resident programs, each in turn checking a struck key. The resident program loaded last has first divvies on your keystrokes. It then passes control to the resident program loaded next to last, and so on back. The ROM BIOS is last in line to get the keystroke. The only real limit to the number of such programs is memory size. Some speed degradation results, but in most cases it is not enough to be noticeable.*

*In real life, programs are not so neatly arranged, however, and resident programs often interact with each other in undesirable ways. Some do more than just check keystrokes. For instance, SideKick uses the timer interrupt to check if any other program has changed the keyboard vector address. If so, it saves that address and puts its own address back in the vector area so it always has first grabs on keystrokes. If you had another resident program that used the same trick, it and SideKick would be grabbing the interrupt vector back and forth 18 times a second.*

*You may also have situations where different resident programs use the same magic keystroke. [This is why in our Programming/Utilities column we always allow users to select their own "trigger" key(s)—Ed.] In that case, the last one to execute would work, and the other would not (unless, of course, the other one worked like SideKick).*

*Interrupt 9 is not the only vector address that resident programs can intercept, however. You can see which inter-*

# WAREHOUSE DATA PRODUCTS

Tech. & Other Information (602) 245-2222  
1-800-421-3135

## INCREDIBLE VALUE!

Nationally advertised boards for IBM PC and compatibles at giveaway prices.

### 1 year warranty

5151 Equivalent Keyboards.....	\$89
Hercules Graphic Board Equivalent with Parallel Port .....	\$99
Monochrome Board with Printer Port .....	\$79
Expansion Board O to 576 K .....	\$59
AST Six Pack Equivalent with game port .....	\$99
Four Drive Floppy Controller .....	\$45
Color Card without printer port .....	\$79
Color Card with printer port .....	\$95
<b>IBM PC CLONE</b>	
256K Expandable to 640K on the motherboard, 2 drives 7 expansion slots .....	\$695

### — LANGUAGES —

Concurrent PC/Dos .....	Call
Fortran 77 .....	208
Lattice C Compiler .....	249
Run C Interpreters .....	89
Microsoft C Compiler .....	239

### — WORD PROCESSING —

Word Perfect 4.1 .....	195
Wordstar Pro Pac .....	238

### — PRINTERS —

#### FREE! PRINTER SET SOFTWARE

Purchase an Okidata, Epson, Gemini, Citizen or Toshiba printer and receive at no charge a menu driven program to set print characteristics or to make your computer function as a correcting typewriter. Retail value \$35. Available for most disk formats.

### CITIZEN

MSP-10 .....	255
MSP-15 .....	355
MSP-20 .....	329
Citizen 3D-Dotmatrix .....	169
Premiere 3D Daisywheel .....	415

### EPSON - Call on all models

### JUKI - Call on all models

### NEC - Call on all models

### OKIDATA - Call on all models

### PANASONIC

1091 .....	239
1092 .....	320
1093 .....	429
KXP3151 .....	410

### STAR MICRONICS - Call for prices

### TOSHIBA - Call on all models

### — HARD DRIVES —

Barnoulli 20 MB 1/4" .....	2439
Seagate 20 MB Internal w/Controller .....	499

### — RAM —

64K 150NS Chips (Set of 9) .....	9.50
256K Ram Chips (Set of 9) .....	27

TERMS: Prices include 3% disc discount. Add 3% for charge and C.O.D. orders. Shipping on most software is \$5.00 AZ orders +8% sales tax. Personal check: allow 10 days to clear. Prices are subject to change. We accept purchase orders.

### WAREHOUSE DATA PRODUCTS

2701 W. Glendale Ave., Suite 6  
Phoenix, AZ 85051

## PRODUCTIVITY

### ■ PC TUTOR

rupts are intercepted by resident programs by loading DEBUG and displaying the first half of the vector area by entering

D 0:0 L 100

Then, load the resident program and look at that area again. Each interrupt (beginning at zero) uses 4 bytes. You can get a listing of all the interrupt functions in the PC Technical Reference manuals or in the comprehensive Peter Norton's Programmer's Guide to the IBM PC.

Obviously, the more interrupts that resident programs intercept and the more things they do with them, the greater the possibility of creating conflicts. It gets to be like a war zone in memory. Unlike a true multitasking system, DOS has no real control over these resident programs, so strange things can happen.

For example, if you have ANSI.SYS loaded and load a version of SideKick prior to 1.5, you'll find that a simple CLS command wipes out the border on a color graphics display. The border is normally preserved on a CLS when ANSI.SYS is used. It took me a long time to figure out what caused the problem (and it wasn't really SideKick's fault).

In general, I think the ability of DOS to accommodate resident programs is one of the neatest features of the operating system. But I'd really like to see commercial resident programs document which interrupts they intercept, and what they do with them. That would allow users to mediate the resident wars that sometimes erupt in their systems.

### BASIC CONVERSIONS

Your second question concerned printing out BASIC files with a minimum of effort. When you save a BASIC program, it is normally stored on disk in a tokenized format—that is, all the keywords are replaced with 1-byte numbers to save space. You can save a BASIC program in ASCII format by following the filename in the SAVE command with a comma and A. The ASCII files take up more space on disk, but you can use TYPE and PRINT on them.

Since you've got a whole disk full of such programs, let me show you how to use redirection of standard output to make a file that the BASIC interpreter can read with redirection of standard input to con-

vert all your BASIC files to ASCII format.

First, you create a small file called LOADSAVE.BAT consisting of the following two lines:

```
ECHO LOAD *$1* >>CONVERT
ECHO SAVE *$1*,A >>CONVERT
```

The double angle bracket means append the text following the ECHO command to the file CONVERT. The "text" written into CONVERT will consist of just BASIC commands.

Next, create a two-line batch file called MAKEFILE.BAT that consists of the following two lines:

```
DEL CONVERT
FOR %X IN (*.BAS) DO COMMAND /C LOADSAVE %X
```

The DEL command gets rid of any existing CONVERT file so you start from scratch. When you run MAKEFILE.BAT on the DOS command level, the FOR command will execute LOADSAVE.BAT for every BASIC file on your disk (or hard disk subdirectory), passing to it a parameter with the name of the batch file. LOADSAVE.BAT will create a file called CONVERT that contains BASIC commands to load each file and save it with the ASCII option.

After you run MAKEFILE.BAT to create CONVERT, all you have to do is execute the command

BASIC <CONVERT

BASIC will load all your BASIC files and save them in ASCII format. Then you can use the PRINT command.

If you don't want to convert them to ASCII format but just want to print them all out, you can do something similar by creating the following two files. First, LOADLIST.BAT

```
ECHO LOAD *$1* >>LISTALL
ECHO LIST >>LISTALL
ECHO SPINT CHR$(13); >>LISTALL
```

Second, MAKEFILE.BAT

```
DEL LISTALL
FOR %X IN (*.BAS) DO COMMAND /C LOADLIST %X
```

Run MAKEFILE.BAT to create LISTALL and then execute

BASIC <LISTALL

Notice that I've included a printer form feed using CHR\$(13) so each BASIC file listing will start on a new page.

I can remember when DOS 2.0 first came out and people took a look at the FOR command, redirection of standard I/O, loading secondary command processors (COMMAND/C), and other features, and people didn't know what to do with these facilities. Obviously, putting them all together has more potential for automating PC tasks than was first evident.

#### TIME-OUT FOR PRINTERS

I recently bought a laser printer that's been giving me problems with some programs, including commands on the DOS command level that redirect output to it. I keep getting a "Write fault error writing device

- The ability of DOS to accommodate resident programs is one of its neatest features.

LPT1. Abort, Retry, Ignore?" For small files, I can keep typing R, but with some programs, this obviously doesn't work well. The printer manufacturer suggests that the problem lies in the printer time-out value stored in the ROM BIOS.

Is there a way to change the printer time-out value? I have checked over the ROM BIOS listings in the *Technical Reference* manual with no success.

Jennifer S. Davis

I agree with the manufacturer: The problem sounds like an insufficient time-out value. Before the ROM BIOS attempts to print something on a printer, it first checks to see if the printer is ready to receive another character. If not, it goes into a loop continually checking the printer status. To avoid permanently hanging during this check procedure, the BIOS counts down using a time-out value. It will only check for the duration indicated by the time-out value. At the end of this time, if the printer is still not ready and you're printing from DOS, you'll be greeted with the infamous "Abort, Retry, Ignore?" message.

On the early PCs, time-outs errors

sometimes occurred during the form-feeds of the IBM Matrix Printer. For this reason, DOS 1.1 (and later versions) increased the time-out value. The printer time-out values are located in the BIOS data area, beginning at hexadecimal address 0040:0078. This area contains four byte values for the four parallel printers that the BIOS (in theory) supports. At boot-up, the current PC ROM BIOS sets the time-out values to 20 (14 hexadecimal), the same value that DOS 1.1 used.

You can experiment with different time-out values by using DEBUG. To double the LPT1 time-out value to 40 (28 hex), for instance, just get into DEBUG and enter the following commands:

```
E 0040:0078 28
Q
```

*Be careful when you enter the memory address: If you get it wrong, you may write over something else. Once you find a value that works well (you don't want to make it too large, since that will cause a long hang if the printer is really off-line), you can add a line to your AUTOEXEC.BAT file to change it everytime you boot up. Just put the two lines shown above into a file called CHGTIME, and add the following line to your AUTOEXEC.BAT:*

```
DEBUG <CHGTIME
```

*If using DEBUG gives you the willies, you can do something similar in BASIC. The BASIC program (which you might call INCTIME.BAS) is*

```
10 DEF SEG=&H40
20 POKE &H78,40
```

*The 40 here (the same as hexadecimal 28) is a good value to start with for experimenting. After you find a good value, you add the line*

```
30 SYSTEM
```

*to INCTIME.BAS and enter the line*

```
BASIC A INCTIME
```

*to your AUTOEXEC.BAT.*

The PC Tutor solves practical problems and discusses points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. ■

# CopyWrite

## BACKS UP IBM PC SOFTWARE

Hundreds of the most popular copy-protected programs are copied readily. CopyWrite needs no complicated parameters. It needs an IBM Personal Computer, or an XT or an AT, 128k bytes of memory, and one diskette drive. CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly to keep up with the latest in copy-protection. You may get a new edition at any time for a \$15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order CopyWrite, send a check for \$50 U.S., or call us with your credit card. We will ship the software within a day.



Quaid Software Limited

45 Charles Street East  
Third Floor  
Toronto, Ontario M4Y 1S2  
(416) 961-8243

About ZeroDisk to run copy-protected software from a hard disk without floppies.

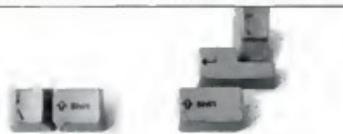
# PC MAGAZINE REVIEWS IN BRIEF

## KEYMATE: An Upgrade for the PC Keyboard

BY VICTORIA DANOFF

IBM PC and XT users who stubbornly refuse to buy a \$200-plus replacement for the much-maligned IBM PC keyboard can now take solace in KEYMATE, a software and hardware system that upgrades PC and XT keyboards to the standard IBM Selectric configuration in a matter of minutes. For about one-third

minutes. Even computer novices who have never tinkered with their machines should have no problems because everything is clearly detailed in the documentation. To replace the keys, you first turn off the computer and unplug the keyboard cable from the rear of the system unit. Then, using a screwdriver, you gently pry off the old keys and press in the new ones. The man-



the cost of replacement keyboards such as the Key Tronic 5150, you can now have your cake and eat it, too—KEYMATE offers easier typing without sacrificing the familiar feel and the "click" of the IBM keyboard keys.

KEYMATE comes with five gray replacement keys and a program called KEYMATE.COM. Used together, the two elements of the system place a wider left-hand Shift key and an L-shaped Enter key in the standard Selectric typewriter locations so that you won't have to stretch as far to reach them. The other three replacement keys are the Tilde (~), the Path (.), and the right Shift. All KEYMATE keys have wide, sculptured surfaces, making typing easier.

The entire installation process, both software and hardware, can take as little as 10

minutes. Even computer novices who have never tinkered with their machines should have no problems because everything is clearly detailed in the documentation. To replace the keys, you first turn off the computer and unplug the keyboard cable from the rear of the system unit. Then, using a screwdriver, you gently pry off the old keys and press in the new ones. The man-

ual gives step-by-step, illustrated instructions for removing and inserting both sets of keys. Overzealous do-it-yourselfers may be tempted to forgo reading the documentation first, hastily grabbing their screwdrivers and yanking the IBM keys off as soon as they spy the brand-new gray keys in the KEYMATE box. Be forewarned: It will be more difficult to do the software installation if the new keys are in place.

KEYMATE.COM software is a RAM-resident program that you add to your AUTOEXEC.BAT file in order to reconfigure your keyboard each time the system is booted up. If you are not currently using an AUTOEXEC.BAT file, KEYMATE has already created one for you. You simply add it and KEYMATE.COM to your working copy of DOS on your floppy disk system or to the root

directory of your hard disk.

KEYMATE will not work with certain programs, including SAMNA Word, XyWrite II Plus, Leading Edge Word Processor, and programs like them, because such software takes control of the keyboard away from DOS. If KEYMATE is in operation when one of these word processors is loaded, the keyboard will revert to its original IBM configuration. As soon as you quit the program, though, KEYMATE becomes operational again. Another hitch is that, unfortunately, the KEYMATE system will work with only IBM computers and not with compatibles such as the Compaq.

Habits are hard to break, so it was awkward at first trying to readjust to the Selectric-like keyboard layout. I kept hitting the Path for the left Shift and the Tilde for Enter, for example. But I can adjust to anything—after all, I did manage to adjust to the IBM PC key layout, didn't I?

The KEYMATE program is

not copy protected, but then it really doesn't need to be. While you can make unlimited copies of the program, you're always limited to one machine at a time because there is only one set of KEYMATE keys.

The documentation clearly outlines the very easy procedures for installing the software with all possible hardware and software configurations. The 24-page manual was typeset and sized to match the IBM Guide to Operations and the DOS manual; it will fit nicely into either one for future reference.

KEYMATE is a good value. Anyone familiar with the Selectric typewriter layout will instantly appreciate the changes KEYMATE imposes upon the IBM PC keyboard. ■

**KEYMATE**  
KEYMATE Systems  
9225 Mirra Mesa Blvd., #212  
San Diego, CA 92126  
(619) 566-2283  
**List Price:** \$59.95  
CIRCLE 62 ON READER SERVICE CARD

## μLYNX: Pointing with a Ball? Yes, a Ball!

BY  
G. HEATHER LUCHAK  
AND GERARD KUNKEL

For those of you who used to hang out in video arcades, the trackball brings back memories of dropping quarter after quarter for a few moments of electronic football. At least that's what we thought of when we first heard of the μLYNX (pronounced *microLYNX*) cursor-control device from Disc Instruments. To our dismay, the μLYNX proved to be a useful tool, not the toy we'd hoped to play with all day. In fact, it proved to be highly productive for real tasks.

Don't count out this trackball for spreadsheets, word processing, and graphics. The μLYNX replaces your keyboard's cursor movement keys with a trackball and three user-programmable function keys. There are preprogrammed key definitions for programs like *I-2-3*, *SideKick*, *WordStar*, and *PC Paintbrush* (the last of which is included with the device), and you may easily define your own character instructions for each of the three keys.

For instance, we used the μLYNX with *WordStar* to write this review and assigned our three most-often-used func-

other software that may also be resident.

*Metatext* provides a full emulation of the IBM Graphics Printer and supports the complete IBM character set, including foreign language variants and graphics characters. Six fonts (Courier, Cubic, Elite, Italic, Orator, and Typewriter, in 10- or 12-ppi spacing) are included with the package, which can be used with most popular word processors.

List Price: \$129

Requires: 256K RAM, one disk drive, DOS 2.0, Epson or IBM printer.

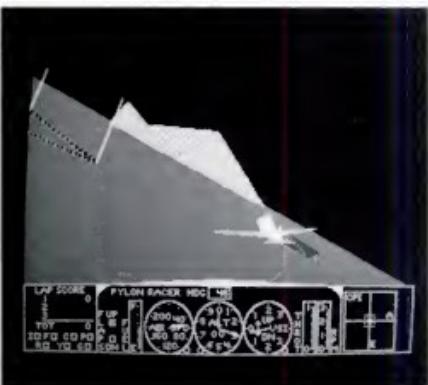
#### Image Computer Systems

P.O. Box 647

Avon, CT 06001

(203) 678-8771

CIRCLE 638 ON READER SERVICE CARD



*Pylon Racer*, Mind Systems Corp.

#### *Pylon Racer*

Mind Systems Corp.'s new flight simulation program pits you against a competing plane in a race along a triangular course. *Pylon Racer*'s graphics show the competing plane in full perspective as seen from the cockpit of your plane. One unusual feature of the game allows you to compete against other *Pylon Racer* players over phone lines in real time, using 1,200-bps modems. Also included in *Pylon Racer* is *Laser Tag*, a dogfight variant of the race.

List Price: \$44.95;  
demo disk, \$5

Requires: 128K RAM, one disk drive, DOS, color/graphics adapter.  
**Mind Systems Corp.**  
P.O. Box 506  
Northampton, MA 01061  
(413) 586-6463

CIRCLE 637 ON READER SERVICE CARD

#### *Replacement Power Supplies*

RAM Technologies Inc. produces a line of replacement power supplies for the IBM PC, PC-XT, and PC AT that allows the user to upgrade a system's power easily. Supplies for the IBM PC and the PC-XT range in capacities from 65 to 150 watts; the PC AT model is rated to supply up to 200 watts.

All supplies are designed to fit the interiors of the IBM systems, as well as look-alike compatibles. Each supply also



*Replacement Power Supplies*, RAM Technologies Inc.

language or macro system. **ENRICH**, *The Methods Expert* uses artificial intelligence techniques to automate screen formatting, data defining and organization, processing, and retrieval functions for an application. The package includes 100 sample applications that can be adapted by the user to particular situations.

**ENRICH** applications are based on screen forms created by the user in much the same manner as business forms are drawn on paper. Data entered into the forms can be selected, correlated with existing data on the form, manipulated mathematically, or printed in reports. Multiple forms can be brought together as windows within a single screen, each of which can be updated independently.

List Price: \$595  
Requires: 256K RAM, two disk drives, DOS 2.0 or later.  
**Migent Software Inc.**  
8300 N. Hayden Rd., #203



*ENRICH*, *The Methods Expert*, Migent Software Inc.

Scottsdale, AZ 85258  
(602) 483-1515

CIRCLE 639 ON READER SERVICE CARD

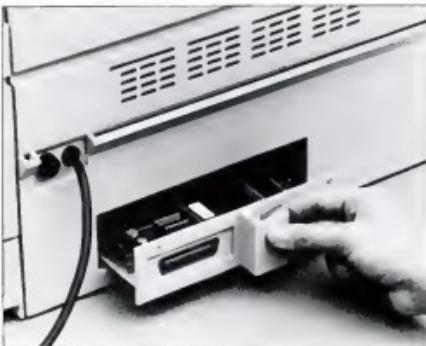
#### *Genicom 5010 and 1000 Series Printers*

Stressing modular design and reliability, Genicom Corp. has introduced new printer models at both the high and low end of its product line. Both the Genicom 5010 Laser Printer and the two-model 1000 Series dot matrix printers use plug-in cartridges for font selection and personality modules that allow each printer to emulate a wide range of popular printers on the market.

Inside the Genicom 5010 Laser Printer, an 80186 microprocessor and a proprietary image processor control a Hitachi laser engine that enables the 5010 to print at speeds of up to 10 pages per minute. Unlike those of many other laser printers, the 5010's user-installable drum, developer, and toner cartridges can be replaced separately. The machine



Genicom 1000 Series, Genicom Corp.



Genicom 5010 Laser Printer, Genicom Corp.

is capable of printing documents at a resolution of 300 by 300 dots per inch and can implement advanced page composition languages such as Adobe PostScript and Xerox Interpress. User-replaceable personality cartridge modules currently available for the 5010 allow it to emulate the IBM Graphics Printer, the Diablo 630, and the Hewlett-Packard LaserJet protocols. The 5010 also accepts font cartridges; these will give it a range of 1,500 different fonts and will be available in the near future.

A 32-character liquid-crystal display on the 5010's control panel displays such information as lines per inch, characters per inch, font selection, and diagnostic data in plain English. The con-

trol panel also allows the user to command a variety of functions like page rotation, form feed, paper size, forms overlay, and paper cassette input.

The two models in the Genicom 1000 Series can reach print speeds as high as 200 characters per second in draft mode (100 cps in near-letter-quality mode); both also feature a unique "clamshell" design that simplifies paper loading. The printers also minimize paper waste by providing an automated means of moving the paper to the tear bar from the printhead, then returning the remaining paper to the printhead correctly aligned for further printing.

The user-installable 18-pin staggered printhead produces

single-pass near-letter-quality and high-resolution dot-addressable graphics containing up to 400 dots per inch. Each printer comes with a 2K-byte RAM buffer as standard, though 8K-byte and 64K-byte buffers are available as options.

Compatibility with a wide range of printer protocols is achieved through the use of plug-in personality modules; currently, the 1025 (80-column) and the 1020 (136-column) can emulate the IBM Graphics Printer, the Epson FX series, the IBM Color Printer, the Diablo 630, and the Genicom 3000 series. Type fonts are selected through the use of plug-in font cartridges, three of which can be inserted into the printer at one time and interchanged within a single document.

An optional, dealer-installable color upgrade kit is available at additional cost and gives the 1000 Series printers seven-color printing capabilities. The kit can be installed at the time of purchase or at a later date.

**List Price:** Model 5010 Laser Printer with IBM Graphics/Diablo 630 module, \$2,995; for HP LaserJet module, add-\$399. Model 1025, \$699; model 1020, \$899; Color Upgrade Kit, \$149.  
**Genicom Corp.**  
Waynesboro, VA 22980  
(703) 949-1188

CIRCLE 634 ON READER SERVICE CARD



**LP3700 Plotter,**  
Palisades Research Organization

plotter protocol, the unit also includes a 14K-byte buffer and two RS-232 ports. Maximum speed of this single-pen plotter is 14 inches per second (10 inches per second axial), and the pen glides over a cushioned track for improved line quality and pen wear.

**List Price:** \$4,995  
**Palisades Research Organization**  
869 Via De La Paz  
Pacific Palisades, CA 90272  
(213) 459-7528

CIRCLE 634 ON READER SERVICE CARD

#### **CRT Space Saver**

This desktop work/storage unit has a central compartment for a personal computer system plus vertical and horizontal storage areas for manuals, disks, and other accessories. Constructed of steel and available in five colors, the unit features six adjustable dividers and a grommeted power-cord raceway.

**List Price:** \$169.95  
**Buddy Products**  
1350 S. Leavitt St.  
Chicago, IL 60608  
(312) 733-6400

CIRCLE 633 ON READER SERVICE CARD

**CRT Space Saver,**  
Buddy Products



# BACK UP YOUR COMPANY'S MOST IMPORTANT PC INFORMATION SOURCE...



## YOU



As your company's "resident PC expert," you're the source for information on IBM PCs—from developing customized applications to recommending software and equipment. You're the one consulted for all the answers.

But when you need answers yourself, where do you turn?

**TURN TO PC TECH JOURNAL.**

PC TECH JOURNAL is your personal back-up system for the in-depth technical information and programming techniques for IBM personal computers. You can depend on it every month for the most authoritative coverage of innovative applications including LAN's, advanced programming languages,

graphics, mass storage, data management... complete with detailed instructions that take you from design stage to implementation.

Subscribe today and save up to 27%!

Use the attached order card, or call

**1-800-852-5200**

toll-free for faster service

For greater savings, subscribe for 24 issues for only \$43.97 and save 27%. Or take the shorter term, 12 issues for only \$24.97 and save 17%.

Note: Since your job depends on up-to-date PC information, your subscription may be tax deductible.

**PC TECH JOURNAL**

Written for IBM PC Experts by IBM PC Experts.

# PC MART

## CAT MASTER®

"THE ULTIMATE TIME-SAVER"

Have you ever forgotten a file name? Or you recall the name but not on which diskette it is located? **CAT MASTER®** eliminates this wasted time as it is much more than a Diskette Cataloger, it is a Diskette Manager. **CAT MASTER®** can extend file names beyond the limits of DOS, so even though you can't remember the actual name, you need only to recall a subject, category, comment, etc., that was associated with the file.

Just present your Diskettes to

**CAT MASTER®**, it does the rest!

For PC's, XT's, Compatibles using DOS Ver. 2, Visa, MC, Check \$19.95 \$3.00 Handling  
(Domestic discounts available)  
(613) 546-5672

**COMPUTERIZED CONCEPTS**  
5191 PARK BLVD.  
PINELLAS PARK, FL 33565

CIRCLE 585 ON READER SERVICE CARD

**BULK DISKETTES**  
BY  
**NASHUA**

**75¢**  
each  
Qty 50

5 1/4" DS/DD with hub ring and Tyvek sleeve, bulk packaged, no labels, factory warranted. Shipping extra. For quantity 50, add 10% each.

Get the same low price our high-volume duplication customers get!

CALL TOLL FREE

**1-800-321-4668**  
in Colorado, 303-234-0871

VISA, MASTERCARD, OR COD ACCEPTED

**ALF** 1315-F Nelson St  
Denver, CO 80215

CIRCLE 565 ON READER SERVICE CARD

## PC SOFTWARE

Public Domain & (User Supported)

PC-Bits (rend processor)	\$6.00 ea
PC-Fax It! (wireless message)	
PC-Calc (spreadsheet)	
PC-CD (modem communications)	
Bus 8 Finance (busiess 8 financial aids)	
PC-DBMS (network database) 102K	
Finance Mgr. (home office bookkeeping-256K)	
PC-Docu (J. document reader, alarm 8 more)	
PC-Draw (vector graphics, drawing 8 more)	
Arcade games (arcade, pinball, space 8 more)	
Basic games (asteroid, a-wing, assault, 8 more)	
PC-Golf (business bookkeeping)	

### Try a Six-Pack

any six of the above only \$34.95  
(all orders add \$3.00 shipping & handling)  
(credit card orders welcome, 10% min. please)

The above programs were written for the  
IBM PC & PC-XT, will not run on some compatibles  
the certain of compatibility before ordering

Soft/Piut Research

P.O. Box 500  
Boonville, CA 94515  
(707) 865-2210  
(800) 852-5848

CIRCLE 566 ON READER SERVICE CARD

pmaster  
for IBM-PC, XT, AT or Compatibles  
MANAGE YOUR COMPUTER  
WITH PATH MASTER

A complete program helping you manage your computer and keep track of the diskettes with each of a single key stroke. With PATH MASTER you do not have to be an expert or computer literate.

- No need for Computer literacy
- No need to memorize DOS Commands
- Password protection
- Single key DOS Commands
- Key Functions always present
- Always current Directory displayed
- Find your path with cursor keys
- Protective File Management
- No more accidental file erasing
- On line help key
- Help menu selected
- ONLY \$49.99 + \$5 shipping/handling

To order CALL  
Outside CA: 1-800-852-8157 ext 876,  
in CA: 1-800-672-3470 ext 876.  
ALINE INTERNATIONAL  
P.O. BOX 24861  
SAN JOSE, CA 95154-4861  
Dealer inquiries invited.

CIRCLE 567 ON READER SERVICE CARD

## ATTENTION! WORD/PROCESSORS

If you are using your computer to write letters, articles, reports, or just memos, you should become a member of the Word/Processing Users' Group.

For more information and membership application write to:



**W/PUG**  
BOX 144-M  
MALVERNE, NY  
11565

CIRCLE 568 ON READER SERVICE CARD

## System Reset Button

PC / XT / RT

I am relatively an system power down often your keyboard locks up... Extend computer life! 10-second installation in seconds. Works great as a restoring or restarting computer memory after a power failure.

System Reset Button, unlike a simple switch, does not require removal of any component or harm the system or any user.

Free shipping worldwide except from Japan.

8000 Disk drives available. Our 8000 Disk holds data in 8000 disk units (removable from keyboard on PC and XT and 800 units from our keyboard driver).

When 800 Disk unit is used with 1000 Bus/Unit in PC, the Bus Unit interface is used with 1000 Bus/Unit in XT. Bus Unit interface is used with 1000 Bus/Unit in PC.

When 800 Disk unit is used with 1000 Bus/Unit in XT, the Bus Unit interface is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

8000 Disk unit is used with 1000 Bus/Unit in XT.

8000 Disk unit is used with 1000 Bus/Unit in PC.

&lt;p



# PC MART

## PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer, when our equipment is designed solely to duplicate disks and verify their perfection 100%?

Over 600 formats. 3 1/2", 5 1/4" and 8". Plus serialization, copy protection, labeling, packaging, shrink-wrapping and fast, personalized service.

**Western  
Transdata Inc.  
DISK DUPLICATION**

1701 E. Edinger Ave.  
Building A4  
Santa Ana, California 92705  
(714) 547-3383 (Collect)

CIRCLE 583 ON READER SERVICE CARD



### Printer Stands

For Your Home or Office!!

- space saving
- convenient paper storage
- slanted for bottom feed
- attractive anodized plexiglass
- two sizes to accommodate all printers

15" for 80 column width - \$ 28.00  
24" for 132 column width - \$ 39.00

Free shipping in the US  
Mass shipments include 5% sales tax  
Call Toll Free - 1-800-824-7888  
Operator no. 580-24 hours  
or call (417) 425-2311  
Thermo Fab, Inc.  
Wately Roads, Shiley, MA 01464.



## PC Power!

delivers 300,000 buyers who are found where buying occurs, from the biggest corporate purchases to the smaller volume sales at department levels or in small businesses.

Use PC frequently, and you'll be reaching these, the most important PC buyers in business, in the source they most depend on to find out what's worth buying. Which simply makes PC the publication most worth buying for you.



Your business  
depends on it

Call (212) 503-5115

# The ONE & ONLY \$150 Client Accounting System

## VERSION 4.0 INTEGRATES WITH MCBS' 5 MODULE GENERAL ACCOUNTING

Version 4.0 of MCBS' Client Accounting System introduces a NEW and UNCONVENTIONAL concept that allows the accountant to access data files from the client's MCBS Accounting software. This will allow the accountant to assist the client in the selection of accounting systems that will meet both the client's and the accountants' needs. With the new MCBS Client Accounting System, the accountant by the client will not have to be re-entered by the accountant. The accountant may pick-up copies of data diskettes along with other account information and enter this data directly into the MCBS Client Accounting system.

### INTEGRATION

Performs Multi-Company Processing and Consolidation of Financial statements.

Performs departmental processing of data and financial statements.

Allows users to maintain ALL General Ledger details for a full year or retention of only selected accounts that you desire.

Performs Multi-Period processing, allowing for prior period adjustments, and REPRINTING prior period financial statements.

SUPER FLEXIBLE Chart of Accounts Allocations Allocations to Establish a master chart for up to 1000 Charts. Copies from one Client to another, or use MCBS Master Chart.

Produces Statement of Changes in Financial Position.

Prints Trial Balance.

Allows for Annualized or Monthly Budgeting.

Includes a form of JOB COST REPORTING.

Includes capability to create and print an unlimited number of Journals.

Produces REPORTS ON SCREEN and/or PRINTER.

Allows Journals to be printed during processing, or bookended.

Account Numbers expanded to 7 character digits.

Includes Full word Processor for Creating and Editing of Disbursement & Collection Letter.

Includes Amortization Module that calculates monthly payments, and prints monthly and annual amortization schedules.

Provides for recurring journal entries.

### EFFICIENCY

NO more time calculating Programs/ Modules during data input.

Payroll checks and General Expenses entered from same screen.

Entry of Payroll ID-Code in

Screen displays the same screen for Payroll entries.

Payroll Data entered ONCE for both Payroll and General Ledger Accounting.

NEW Accounts or NEW Employees can be added to file during data entry without exiting the program.

Entry of Vendor's MCBS ID-Code in Description field displays

Description you have set up for vendor, including address, telephone, frequent Vendors, Sales Alpha Registers.

Customer Increases automatically if desired. Account number, description and date will imprint if desired.

Disbursements as well as last 10 entries displayed on screen during data entry.

BONUS-Special Parallel Entry module allows accountant to set up a sequence of pre-determined accounts that you can enter for resources.

Used for various types of businesses using daily reports.

System includes automatic Report Printing feature. Selects the Reports to be printed and the order and system does the printing while operator performs other tasks.

REPORTS GENERATED

All journals, including Cash Disbursements, Receipts, and General Journals.

Balance Sheets, Consolidated, Departmental, Comparative to Budget or Previous Year.

Income Statements, Consolidated, Departmental, Comparative to Budget or Prior Period.

Change in Financial Position.

Trial Balance, Chart of Accounts.

Detailed General Ledger, and Sub-accounts.

Post-Journal, 941's, W-2's, 1099's, Summaries for State Payroll Reports.

SUPPORT

Complete Manual on Diskette, you Print it on your printer.

Telephone Support available, 10 calls for \$50.

FREE TELEPHONE START-UP HELP

FREE NEWSLETTER

Micro Computer Business Services

1703 Southover Avenue, Houston, Texas 77014

CLIENT ACCOUNTING 8150  
TO ORDER CALL:

**1-800-FOR-MCBS**  
1-800-367-6227

For More Information  
Call (713) 444-8269

— UNCONDITIONAL —  
MONEY BACK GUARANTEE

Service Contracts:  
Up to 10 telephone calls for advice,  
Setup Client Accounting  
Training Resident 6 wks/Tel  
OOD Charges \$6.00  
Payment By Check, MC, or VISA

All programs run on IBM PC/XT/ATL  
Apple II, SPARC, Tandy 1000, Commodore  
64, Wang, Compaq, Comdora, Sanyo,  
COLUMBIA\*, and most other MS-DOS  
machines. Written in MS-BASIC compiled basic  
language. 128k RAM required.  
80 Column Printer, MS-DOS, PC DOS 3.0 or  
later

\*Commodore & Sanyo require some modification  
to their respective microprocessors

COMPLETE 5 MODULE  
Accounting System

General Ledger, Accounts Receivable, Inventory

With Order Entry & Purchase Orders.

Integrates With Client Accounting

\$50

Call (713) 444-8269 for more information

Customer	Phone	Date
Customer Name	Phone Number	Date
Customer Name	Phone Number	Date
Customer Name	Phone Number	Date
Customer Name	Phone Number	Date

CIRCLE 166 ON READER SERVICE CARD

# PC BLUEBOOK

## ACCESSORIES

## FURNITURE

### ??UGLY???

Turn that ugly PC into a beautiful piece of furniture. Solid oak covers for your PC or monitor handmade by Starbuck Minchin, professional cabinet maker for over 50 years. \$49.95 each or both for \$89.95. Perfect fit for IBM or Compaq computers. Money refunded if not satisfied. Check, MC, Visa  
STARBUCK MINCHIN  
606 Santa Barbara St.  
Santa Barbara, CA 93105  
805-962-5305

## ACCESSORIES

## SUPPLIES

### 2-LINE BUSINESS PHONES

Incredible features include (FCC Approved):  
\*2-Lines + Hold + Conference (3 party) buttons  
\*54 Memories, suitable for MCI or SPRINT  
\*Hands Free Dialing with Speaker Phone  
\*No need for AC Adapter—Mains on hold  
\*One year Warranty - Only \$69.00 per set  
\*Write for detailed color brochure  
VOGUE IMPORTS INC  
1623 Valley Street  
Van Nuys, CA 91406  
(818) 951-0441

### LASER PRINTER USERS!

Toner Cartridge Recharge Kit \$99.00  
(instructions & one recharge)  
TONER ONLY (ONE REFLILL BLACK) \$20.00  
REFILLED CARTRIDGES \$40.00  
Call (617) 821-1427 or send orders to:  
PC Corp., 1030 Tumpley St., Canton, MA 02321  
(all orders sent UPS collect if not pre-paid)

### COLOR PRINTER RIBBONS

Brown, Blue, Red, Green, Purple  
C. ITOH PROWITER, IMAGEWRITER  
\$ 8.50 Ea  
COLECO ADAM \$12.50 Ea  
EPSON MX-100, FX100, FX165, \$12.50 Ea  
Minimum Order 2 of any color. Send Check or  
Money Order plus \$2.00/ea. NJ Add 6% Tax  
PRINCETON OFFICE SUPPLY  
43-15 DUAL RIDGE DRIVE  
PLANSBORO, NEW JERSEY 08536  
609-799-2515

## FREE CATALOG

Outstanding prices on computer accessories for your computer and workstation. Our catalog features a wide selection of quality products to meet all your accessory needs. Call or write today to receive our free catalog.

LINTEX COMPUTER ACCESSORIES  
PO Box 8056  
Grand Rapids, MI 49508  
(616) 241-4040

## BAR CODING

### BAR CODE—LABEL PRINTING

THE LABEL MAKER™ prints bar codes, OCR-A like and large characters from data entered at keyboard or from disk files. Print and save unique printing formats and record layouts. Performs record add, change, delete, sort and select on disk file. AI LABELMAKER™ prints AIG shipping/parts identification labels required by Auto Manufacturers. Programs require IBM PC or work alike.

TJ SOFTWARE INC.  
P.O. Box 2044  
Arlington Heights, IL 60006  
(312) 364-1065

### BAR CODE READERS/MAGNETIC STRIPE READERS

TPS provides Bar Code and Magnetic Stripe Readers/Encoders and combinations of these for simple installation on IBM PC, AT, and 3180 terminals. DEC Rainbow, Professional, and VT 200 series terminals, NCR DecisionMate V and PC IV, TPS, AT&T, Olivetti, Wang PC and VS 2020, Apple Macintosh, Northstar Dimension, Bar code label printing program \$50 w/ reader purchase.  
TPS Electronics  
4047 Transport Street  
Palo Alto, CA 94303  
(415) 856-6833

### BAR CODE LABEL PRINTING

PRINTBAR™ is a set of well documented programs written in both MBSASIC™ and dBASEII™. The programs print Code 3 of 9 barcodes from sample data files on OKidata and Epson compatible printers. In addition, PRINTBAR™ documentation includes how barcodes work and where to get barcode readers. \$149 plus \$7 Shipping and Handling. C.O.D.  
Bear Rock Software Company  
P.O. Box 212  
Pleasantville, CA 95667  
(415) 522-4640

## COMPUTER/ INSURANCE

### SAFEWARE

If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media and purchased software. As little as \$39 a year covers fire, theft, power surges, earthquake, water damage and auto accident. Call 8 am to 5 pm Monday thru Friday Saturday 9 am to 5 pm  
SAFEWARE, THE INSURANCE AGENCY INC.  
2929 N High Street  
Columbus, OH 43202  
(614) 262-0559 (OH), (800) 848-3469 (NAT)

## COMPUTER REPAIRS

### IBM PC/XT/PPC & COMPAT PORTABLE REPAIR

Circuit boards and electronic sub-assemblies professionally repaired on ATE (Automatic Test Equipment). An alternate solution, with lower pricing and fast turnaround. Dealer & Maintainer packages available. From keyboard to power supplies. Call  
UNITRACE  
2198 Del Franco St.  
San Jose, CA 95131-1575  
(408) 946-1090

## BUSINESS OPPORTUNITIES

### MONEY MAKER FOR CONSULTANTS

Time management is the key to your share of \$5 billion and specialized software/hardware sales projected by 1990. LTM time and billing software for large and small professional firms has received a published national rave review. Use it for your own billing and sell it to attorneys, CPAs, and all others who bill for their time. Dealer discounts on every sale. LTM is consistently chosen over heavily advertised products some costing 10 times its \$495 price. Send for details.

MEGA-META, Inc.  
8990 Loyd Place  
Los Angeles, California 90069  
213-278-5249

Personal computer owners  
**CAN EARN \$1,000-\$5,000**

### MONTLY

by selling simple services performed by their computer Work at home—in spare time. Get free list of 100 best services to offer. Write:

C.I.L.D.K.  
P.O. Box 6369  
San Diego, CA 92106-6369

## COMPUTER/ INSURANCE

### FULL SPECTRUM

of Data Conversion services  
• Quick Turnaround  
• Highly Professional  
• Most Conversion Scenarios

Computer System Services, Inc.  
5 East 16th Street  
New York, NY 10003  
(212) 242-5255

### DON'T REKEY-CONVERT!

We use the latest disk, tape, scanning, & telecommunications technology to reformat data for you. QUICKLY AND ACCURATELY USUALLY AT ONE TENTH YOUR CURRENT COST. We transfer data between word processors, typesetters, micros, minis, mainframes, & software packages. We supply a full range of consulting services including Data Customization and Database Development.

Data Conversion Laboratory  
67-27 16th Street  
Fresh Meadows, NY 11365  
718-939-4521

## COMPUTER SERVICES

### CHANGING WORD PROCESSORS?

We convert to and from

XEROX	PC-DOS
DEC	WORDSTAR
IBM	MULTIMATE
LANIER	SAMBA
WANG	ASCI
CPT	MICOM

WORDPERFECT

Also most CP/M systems. Call for our low prices  
Test conversions available.



**Data Conversion, Inc.**  
800 California Street, Buena Park, CA 90620

## ■ BLUEBOOK

### DISK CONVERSION SERVICE

#### WP & PC MEDIA CONVERSIONS

The oldest media conversion bureau and translator manufacturer in the nation! We build the devices most others use for their conversions. We convert all major WP's, IBM PC's, 9-tracks, etc. While maintaining easy editability. Guaranteed best price and turnaround! Systems Compatibility Corporation 410 N. Michigan Ave., Chicago, IL 60611 (312) 329-0700 or (800) WP-CODES

### DISKETTE COPY SERVICE

#### 9 TRACK TAPES to IBM-PC

Convert mailing lists or other main frame data on 1600 BPI 9-track tapes to PC-DOS 5 1/4 diskettes. New automated process guarantees data verification. Easy instructions for loading to your data base (dBase, RDB4000, etc.) or hard disk. Only \$60 per million chars. \$95 minimum. Bernoulli box \$30/M A/S Inc 1259 El Camino, Suite 260 Menlo Park, CA 94025 (415) 323-6336

### HARDWARE

#### ADD-ON ACCESSORY

#### HYPERION OWNERS

Are you running out of memory? HyperRAM—Minimize external plug-in module (41/2" x 57/8" x 75") increases the memory to 512K or 640K. Now available! \$350/\$450  
Technovation Research 63 Widdicombe Hill Blvd., Suite 1103 Weston, Ontario N5R 4B2 (416) 245-1656

### HARDWARE

#### ADD-ON BOARDS

#### FIXED DISK BIOS/BOOT

Fix boots from most popular Hard Disks—DA-VONG, XEBC, IOMEGA, GT LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Secure, multiple volumes, removable media support optional. No-slot plug-in installation. Specify controller and computer with order. \$80-\$180 Add \$3 shpg. CA tax.



GOLDEN BOW SYSTEMS  
PO BOX 3039  
SAN DIEGO, CA 92103  
(619) 238-9349

#### SPEED UP YOUR IBM AT

Our speed kit can accelerate your system from its current speed of 6 mhz to 10 mhz (66% increase). 80 test/utility programs included. Easy instructions, non-technical installation. No soldering involved. 99% success rate. From \$10 to \$49.95. Visa MC COO. Call about High Speed 80286, 80287 and other AT enhancements. AMS/AT Enterprises.

18045 Cocklebur, Ste A  
Rowland Heights, CA 91748  
(818) 810-8443

#### 256K & CLOCK FOR \$99.95?

The Turner Hall Card comes with 256K RAM installed and clock/calendar with battery back-up. Even beginners can install. Free software includes print spooler and RAM disk emulator. Designed for IBM PC, XT, Portable PC and Compaq. Fits in short slot (only 5 inches long), 30-day money-back guaranteed. Turner Hall Publishing, 10201 Torre Avenue, Cupertino, CA 95014 1-800-556-1234 x526 (CA 800-441-2345 x526)

#### MEGAMEMORY FOR MINIBUCKS

Fully populated TWO MEGABYTE Tall Tree Systems board. Lowest prices in USA. Corporate accounts/credit cards accepted. Add 2% S & H. JRAM-2 \$299  
JRAM-3 ABOVE BOARD \$369  
JRAM-AT \$349  
JRAM-KT-J ABOVE BOARD \$399  
The RAM EXPLOSION 5119A Leesburg Pike, Suite 260 Falls Church, VA 22041 (703) 569-4471

#### 8 PORT SERIAL I/O

At last a single board for the IBM PC to drive 8 serial ports. Full RS232C on all ports, asynchronous, separate baud rates on each port. Based on the IBM standard IN86250. Make your own serial talk to 8 CRT's from one application program, or connect multiple peripherals. Delivery: 8 to 3 weeks. Price: \$275 (quantity 25). Circuit Craft, Incorporated 16802 Colument Avenue Gaithersburg, MD 20877 Phone: (301) 963-3305

#### IEEE 488 CONTROLLERS

The most respected name in GPIB interfaces for microcomputers offers you two IEEE 488 Controllers for IBM compatible Personal Computers. Ziatech's experience guarantees you the best documentation and most efficient software available. Two year warranty. Call or write for free information packet.



Ziatech Corporation  
3430 Roberto Court  
San Luis Obispo, CA 93401 USA  
(805) 541-0488 TEL 4992316

PC MAGAZINE • FEBRUARY 11, 1986

#### HARDWARE

### COMMUNICATIONS

#### SMART ANSWERING MACHINE

SAM transforms your IBM PC into an intelligent phone answering & real-voice messaging center. FEATURES: 999 personal messages, call screening message forwarding, timed or grouped message delivery, sortable phonebook (subscriber, time/date log, voice prompted remote access) AND MORE!! All hardware & software included RETAIL PRICE \$295. VISA/MC.



DUALEXTION, INC.  
2035 California St., Ste #17  
Mountain View, CA 94041  
(415) 963-3040

#### CUSTOM PRODUCTS

Creative Communications, Inc., Custom Product Division, offers research, development, and manufacturing capabilities, according to your product specification, budget, and schedule. In most cases, functional prototypes can be completed within 90 days. Call us today to discuss your new product needs.

Creative Communications, Inc.  
1662 West 820 North  
Provo, Utah 84601  
(801) 373-9843 TLX 489241

#### HARDWARE

### COOLING DEVICES

#### LESS NOISE! MORE COOLING!

Does your PC sound like a high speed turbine? Does it use expansion cards that create extra heat? Solve your noise & cooling problems with the SILENCER from PC Cooling Systems. Each model utilizes a super quiet, West German, all metal, 41/2" fan. Model SD costs with 84% less noise than the standard fan if replaced! Model HP provides over 100% more cooling! Mounts to existing holes on the back of the IBM PC or AT. Immed Shppng \$79.95 - \$45/mo VISA/MC/OK

PC COOLING SYSTEMS  
3510 Via Ararat Dr.  
Bonita, CA 92003  
(619) 723-9513

### HARDWARE

### DISK DRIVES

#### B INCH DISKETTE SYSTEM

Read, write, and format diskettes from IBM mainframes, minicomputers, data entry equipment, etc. Complete easy to use software handles ESDCDC conversion. Can read and write CP/M 8-inch diskettes (many formats). You also can use 8-inch drives for PC/OS files. 1200 KB per diskette! \$150 complete. MicroTech Exports  
644 Emerson St., Suite 8  
Palo Alto, CA 94301  
(415) 324-9114

### HARDWARE

### PERIPHERALS

#### TURBO START YOUR PCII

FOR IBM PC's ONLY! THE PC-INITIATE. A Firmware ROM Module for the IBM-PCII Features BOOT within 10 SECONDS!!! BREAK THE 640K BARRIER! Access up to 704K of RAM!! (Lotus, DOS, etc.) SCREEN RELIEF - protects your monitor and MORE!! EASILY PLUGS IN-N-SLIDE!! Only \$49.95 - \$3.50 SH/DT inquiries accepted. CK/MO/VISA/AMC



J.S. & J SOFTWARE  
1281 S. King St., Suite 6A  
Honolulu, HI 96814  
24 hr Orders only: (800) 821-5226 ext. 435

#### NEW! OVERTHRUSTER™

- \* Actual 60% Speed increase (7.38 MHz)
  - \* 100% Compatible with all PC software
  - Includes IBMX 8088-2 CPU and Hardware reset
  - \* Supports IBMX 8087-2 Match Processor chip
  - \* No expansion slot needed—easy to install
  - \* No software required—1 year warranty
  - Price is only \$295.00—Same day shipping
- Data Management Systems, Inc.  
2141 Connerial Rd.  
Salina, KS 67401  
(913) 823-6440

#### NEW! AT SPEED SWITCHER

- \* Select 6 speeds of operation 4, 6, 8, 9, 10 and 11 MHz (30 to 70% speed increase)
  - \* Allows proper operation of PC software run on an AT—100% software compatible
  - \* Speeds up your entire software library
  - \* No expansion slot needed—easy to install
  - \* No software required—1 year warranty
  - Price is only \$125.00—Same day shipping
- Data Management Systems, Inc.  
2141 Connerial Rd.  
Salina, KS 67401  
(913) 823-6440

## ■ BLUEBOOK

### SHARE PC PORTS FOR \$200

SHARE multiple PCs with a printer or a modem  
NO MORE manual switches or less of data  
SHARE a terminal with a modem or a printer NO  
MORE cable swapping or T-switches SHARE  
printers SWIFTLY with one PC Call to  
learn more about expanding your resources—  
without inflating your budget.



TIAMAT  
PO Box 470300 Suite 1113  
Tulsa, OK 74145  
(918) 627-0891 or 627-7594

### HARDWARE POWER PROTECTION

#### MEIRICK STAND-BY POWER

THE MEIRICK STAND-BY POWER SYSTEM provides back-up power and protection from power failures, brownouts, surges, spikes, and power line noise. The enclosed battery will supply a long run time during a power failure. 240 with system-\$365, 400 watt system-\$495, 800 watt system-\$795.  
MEIRICK INC. POWER SYSTEMS DIVISION  
Box 298  
Frisco, CO 80443  
(303) 658-3251

### HARDWARE STORAGE DEVICES

#### COUPLER FOR 9 TRACK TAPE

Two models available. To read and write 15 in magnetic tape with formatted 9 track drives. Runs all speeds and densities in PC, XT and AT running MS-DOS or XENIX. Data transfer up to 904,000 bytes per second! Complete with cable and software, prices start at \$860.  
OVERLAND DATA, INC.  
5644 Kearny Mesa Rd  
San Diego, CA 92111  
(619) 571-5555

### MAILING LISTS

Now over 655,000 micro owners. Selected by brand: 219M Apple, 179M IBM PC, 156M TRS 80, 97M Commodore and more! 9 phone verified reseller lists including: 6,211 stores, 14,619 chain buying offices, Canadian and more! 25,000 Unix users 14,000 computer companies. Lists by software brand, printer model, modem owners, investors, educational, etc. Over 75 different micro and mini lists. Call or write for FREE catalog. Include phone and type of business you're in.  
Inv. Brechner  
TARGETED MARKETING INC.  
Box 5125  
Ridgewood NJ 07641  
(201) 445-7196

### PUBLICATIONS CATALOGS

#### ASSEMBLY LANGUAGE A SNAP!

At last a truly readable guide to PC Assembly language programming! Uses the system debugger as I/O device for easy, reliable coding. Covers basic to advanced topics step-by-step. Complete opcode & instruction sets. Lots of examples and exercises. 407 pages only \$16.95 at bookstores, and send check - \$10.00 S&H to LITTLE BROWN & CO PUBLISHERS  
200 West Street, Code M5209-1  
Waltham, MA 02254  
1-800-343-9204

### SECURITY

#### STILL WAITING? INSECURE?

DUCKON Instant Turn-on module-\$169.95  
LOCKIT-1 Password Boot-up module-\$129.95  
User selectable PW & Boot-only-from-HD mode  
PC RESET-Reboot via cycling power-\$21.95  
Easy to install. No slot specify PC/DX/T/M  
LOCKIT-1/PW protection for subdirectories, for  
DOS 2.0 & up-\$47.95  
MC/195A  
SECURITY MICROSYSTEMS CONSULTANTS  
16 Flagg Place, Suite 102 PC  
Staten Island, NY 10304  
Telephone (718) 667-1019

### TAPE TO DISK CONVERSION

#### TAPE TO DISK CONVERSION

Convert any 9-track magnetic tape to/from over 500 formats including: 3½", 5½", 8" disk formats and word processor. Formats available include: IBM-PC, APPLE, Ataris, 80/80-E CP/M, Displaywriter, 16M, 515/77, Macintosh, Wang, LA-NEUR, QSL/6 and 500+ Disk to disk converters also avail. Call for more info.  
PVIAR COMPUTING SERVICES, INC.  
47 W Dunster Rd  
Wheeling, Illinois 60090  
(312) 459-6070

1111

#### TAPE/DISK/MICROFICHE

Convert IBM disk (360 KB or 1.2 MB) to/from Magnetic Tape (9 Track 800, 1600, or 6250 BPI) \$10/360 KB disk, or \$40/1.2 MB disk. ASCII \$15/360 KB disk, or \$60/1.2 MB disk EBCDIC TAPE. Convert reports from disk to Microfiche. Store 208 (11x14") pages on DNE (1) 4-6" Microfiche \$10/Microfiche  
Technical Programming Services, Inc.  
8506 East 61st Street  
Tulsa, OK 74133-1301  
918-254-9622

### SOFTWARE ACCOUNTING

#### CUSTOM PAYROLL

All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance. Prices start at \$695.00 for basic system and manual:  
DATAMATRIX, INC.  
Box 8036  
Shawnee Mission, KS 66208  
Phone: (913) 381-9118

#### PC-FUND

PC-FUND is a fund accounting system for local govts., schools, colleges, and not-for-profit group. The system includes: General Ledger, Report Writer, PO/Encumbrance, payables, receivables, payroll/personnel, budgeting, utility billing and fixed assets. The system supports up to 99 funds, 9999 departments and up to 36 fiscal periods are on line. PC-FUND runs on the IBM-PC and most MS-DOS & XENIX computers. AMERICAN FUNDWARE, INC.  
P.O. Box 773028  
Steamboat Springs, Colorado 80477  
(303) 879-5770

#### CPA REVIEW, CPE CREDITS

MCRO Managed Study Help. CPA Review • CPE Hours • Diagnostics for CPA, CMA, CPA Exams • Personnel Evaluators • Recruitment IBM PCs or compatibles • Individual, Office and College Packages Available Use DAL-A-DEMO with your Modem Advanced Software for Advancing Accountants



MicroMash MCRO MANAGED STUDY HELP

P.O. Box 6512  
Hurstville, TX 77340  
1-800-241-9700  
In TX (409) 295-1597

#### CRYSTAL PAYROLL

Fast and easy to use. Computes wages and taxes in seconds. Prints checks with itemized stubs or stubs only after the fact. Ten user defined pay types for hourly, salary, dollar, bonus, commission, tips, and piece rate wages, expenses, and ten voluntary deductions including 401Ks. True multiple pay and deduction rates. Allocation to multi GL, acccts and depts. Multi company, ideal for payroll services. Federal, state and local taxes with flexible employee options. Quarterly and year-end reports. Standard \$395, Restaurant \$595, Construction \$595, Farm \$395 VISA, MC, AMEX, 30 day money back guarantee.  
CRYSTAL SOFTWARE  
3100 Broadway, Suite 203  
Boulder, Colorado 80302  
(303) 443-5528

#### G/L ACCOUNTING POWER

Now, the same financial reporting power used by offices of all "Big 8" is available to corporate controllers. AMTS's DATARWITE™ Corporate General Ledger gives complete flexibility for custom reports. Fixed Asset Management and Financial Plan Link to Lotus 1-2-3™ are available too. Nationwide support.



Accountants Microsystems Inc.

3633 136th Place SE  
Bellevue, WA 98007  
800-425-8200, 206-643-2050

#### CASH CONTROLLER FOR \$3

Check Book & ShoeString™ "A personal or business CASH CONTROL system. Uses bank & cash transactions to track income, expenses, & CASH FLOW. Prints checks, extract income summaries by acc't totals. Excellent for tax preparation. Fully menu driven. Requires Lotus 1-2-3 Symphony/IBM PC or compat. Add \$2.5/H VISA/MC accepted  
Add Electric  
34643 Allegheny Court, Freemont, CA 94536  
National Orders (800) 321-4190  
(415) 791-6994 CA

#### CONSTRUCTION ACCOUNTING

The CMAS system is designed for contractors where tracking job costs is required. Modules include JobCost, Payroll, A/R, A/P, General Ledger, Estimating, & Service Billing. CMAS software is fully integrated, includes automatic invoicing & Yes-in to most spreadsheet & WP programs. Multi-terminal available.  
DATA-BASICS, INC.  
11000 Cedar Road, Suite 110  
Cleveland, OH 44106  
(216) 721-3400

## ■ BLUEBOOK

### SOFTWARE BUSINESS

#### CUSTOMER SUPERBASE \$35

This easy to use powerful menu driven customer info system has helped thousands. Find customers in one-two secs-no sorting. Unlimited number of records & labels per customer. Full screen editing. Mailing labels by zip or name. Password protection. Full customer lists. Take memos recall them later & much more! \$35 call.

#### MAKE LIFE EASY! ASK ABOUT SUPER UTILITIES!

PLACE MANAGEMENT CORP  
50-25 65TH PLACE  
WOODSIDE, NY 11377  
VISA/MC (718) 651-4700

#### dBASE III/III SOFTWARE

GENERAL LEDGER (integrates w/  
dINVOICE) \$99  
dINVOICE (Billing & A/R) \$99  
SALES ANALYSIS (Works with dINVOICE) \$99  
JOB COSTING (for Contractors) \$99  
JOB ESTIMATING (Works with Job Costing) \$99

SOURCE CODE included for dBASE I or II. Requires printer. 2.360K Floppy or Hard Disk.  
DATAMATRIX SYSTEMS—(619) 223-3344  
1152 Albero St.  
San Diego, CA 92106  
Master Card-Visa-Check-COD

#### PROFESSIONAL TIME/BILLING

Handles 400 clients, 20 partners, 80 job # (40 out of pocket expense) descriptions, 20 area of practice codes, fixed fee or per hour billings, & more. Prints billings, monthly statements, aged receivables, & more. Free telephone support. \$149 (VISA, MC, AMEX). Other original software Call/Write for FREE CATALOG!  
MICRO-ART PROGRAMMERS  
173 Birch Avenue  
Cayucos, CA 93430  
(805) 995-2329 (24 hour)

#### PC ORDER PRO

For Manufacturers, Wholesalers or Retailers: MAKE MORE MONEY by automating your order processing function. Handles Cash and Charge sales with an End-of-Day Cash and Sales Summary report. Produces a Customer Receipt/Picking slip. Keeps track of Inventory. Can easily use BAR CODE or OCR input. Will Import/Export files in ASCII format. EASY & FAST with full online HELP screens. Runs on most MS DOS computers with 384K, hard disk, 80 col printer. Cash drawer optional. Custom modifications & Support available.

COLUMBIA SOFTWARE, INC. \$249  
10420 S.E. Hibbert Drive Demo \$15

Portland, OR 97266

(503) 654-7722

### TIME ACCOUNTING & BILLING

TABS is designed for use by professionals based on the basis of time (attorneys, accountants, etc.) A.B.A. approved. Quick-easy entry and edit. TABS is easy to understand and operate. TABS full feature software is currently in use by over 1400 firms nationwide. PC-DOS, MS-DOS, Novell Networks. For details contact:



SOFTWARE TECHNOLOGY, INC.  
620 No. 48th, Suite 120  
Lincoln, NE 68504  
(402) 466-1997

#### BILLING/INVOICING

MANAGEMENT MADE SOFTWARE SERIES-BILLING™ designed with simplicity in mind. Professionals, retailers, and manufacturers, prepare bills or invoices the way you already know how. Produces a professional bill/invoice, daily and monthly summaries, aging reports, monthly statements and more. Does not use time or inventory! \$199 + \$5 u/h \$35 demo disk.

DEPALANTINO/CATAROUDIS  
22 South Clinton Street  
Dayton, PA 18020  
(215) 343-4771 (215) 345-0433

#### TPR88—

#### TRANSPORTATION ROUTE

A powerful interactive system for finding routes on transportation networks. Networks may have up to 512 nodes and 32768 links. Includes procedures for finding the shortest path between two points... sequences of up to 50 stops, links minimum spanning tree, times or distances between all points. Menu-driven, graphics display, & features similar to LP88 Rev. 19/2K, color graphics \$99 w/8087 support, user guide, U.S. road network, VISA/AMC

EASTERN SOFTWARE PRODUCTS, INC.  
POB 15328

Alexandria, VA 22309

(703) 549-5469

LP88-LINEAR PROGRAMMING

A powerful menu-driven system for solving linear programs with up to 255 constraints and 2255 variables. A new product version accepts problems up to 510x250. Features include interactive and batch operation, spreadsheet-style input and editing, a storage system for problems and bases, sequential file input/output. Simple algorithm restart, a complete report generator, sensitivity analysis. Requires 180K, \$99 w/8087 support, user's guide, VISA/AMC

EASTERN SOFTWARE PRODUCTS, INC.  
POB 15328

Alexandria, VA 22309

(703) 549-5469

#### QUERY FACILITY/REPORT WRITER

"qPLEX" IV reads "any file formats" (COBOL, BASIC, dBASE, Btrieve, ASCII, etc.). Lets you select/sort/print/summarize (your own special forms, reports, labels, bar graphs) or query. Export your existing data to spreadsheets and word processors. No programming required. Dealer demos available. DOS, Xenix Unix.  
Show Software Corporation  
3330 Fisher Road  
Clearwater, FL 33519  
(813) 784-8899

### SOFTWARE

### BUSINESS PROJECT MANAGEMENT

#### AHA! (408) 458-9119

You found it! The Number to call for software to manage any complex project, e.g., R&D, CONSTRUCTION, BUSINESS/VENTURE PLANNING! Demo Sampler-Pack includes PMS-II, RMS-I, RMS-II, HARVARD TOTAL PROJECT MANAGER, HORNET, PERT-MASTER, TIME-LINE, SORCIM/SUPER-PROJECT PLUS! Our staff of Project Managers and Microcomputer professionals provide NEEDS ASSESSMENT, SET-UP, TRAINING, INDIVIDUAL CONSULTATION by arrangement!



AHA! INC. P.O. Box 8405  
Santa Cruz, CA 95061-8405 (408) 458-9119  
Project Management SERVICES!

### SOFTWARE

### COMMUNICATIONS

#### COMPUTER-TELEX-LINK

Link your computer to telex with Cawthon's Computer-Telex-Link. Available for US and overseas applications. Cawthon's Telex-Link is easy to use, has on-line help, self-test diagnostics, quickly called numbers, a complete User's guide, and excellent support. For many computer and operating systems



2424 Michigan Avenue  
Dearborn, Michigan 48124  
Phone 313-565-4000

#### WANT FREE SOFTWARE?

Bulletin boards have it. VOR-TALK puts it on your disk! Can pay for itself in 10 minutes! On-Line Help. Windows. Menus. Split-Screen viewing/translating on two ports system. Dozens of emulations & MUCH MORE! FAST FRIENDLY & POWERFUL! For IBM & Compatible w/192K, sync & DOS 2.00 & up. Perfect for business too! \$145 Visa & M/C (One Resident Add 6%)

VOR-TECH Corp  
164 6th Ave. (Chest)  
Marietta, Ohio 45432  
513-746-8416

### BULLETIN BOARD SPECIAL

IDEA-TREE—Our acclaimed multiple-topic system. Offers public and private message areas, each with file transfer capability, Xmodem, database, DOS interface and more. Powerful yet easy to operate! ----- \$89  
• PC-DATE—matchmaking system ----- \$89  
• On-line BBS demo at (206) 932-7125  
VISA/MC  
Protosoft  
P.O. Box 16756  
Seattle, WA 98116  
(206) 932-5310

### SOFTWARE

### DATA ENTRY

#### SIDES/PC

Replace your 129, 329, 374/3742, 5290, etc. Versions. Extended keylayout to comprehensive, fullfunction for high volume, heavy editing. Features include standard keypush = verify, table lookup, search, insert/delete, logical chain select, balance, statistics & much more. Prices start at \$195—30 day free trial.  
Software Consulting Service Inc.  
8930 Fournier Drive, Suite 231  
San Antonio, TX 78239  
(512) 656-5484

### RODE/PC DATA ENTRY SYSTEM

RODE/PC is unmatched for power & ease-of-use. Menu-driven, pop-up help, heads-down speed, extensive input validation, automatic reformatting, conditional processing, operator stats, 229 keyboard option, much more! \$40 demo \$995 for first license, \$395 each additional. Volume discounts.

DPIX INC  
20623 Stevens Creek Blvd., C-1  
Cupertino, CA 95014  
(408) 973-9292 TELEX 70111

#### ENTRYPOINT

Most widely installed data entry system for PC/XT/AT. Heads-down speed, sophisticated multi-screen applications. Features: feature rich screen form design, data validation, table & file lookup. Help keys, logic processing, reformatting, batch totals, verification 129 KB reformatting & more. Demo \$24 Operator \$545 Developer \$845. Volume pricing:  
DATALEX  
650 5th Street  
San Francisco, CA 94107  
(415) 541-0780, (800) 962-8888

#### DATA ENTRY EMULATOR

Heads-down data entry for the PC will allow fast and accurate entry of batch data files. The program can redefine the keys for a 3741 Data Entry style keyboard. Features: Auto auto, two-pass verification, constants, auto-format change, table lookups, range checks, batch totals, dup key, on-screen paging and much more. Easy layout generation. Free 30 day trial period. Only \$395.  
COMPUTER KEYES  
6519 193 SW  
Lynnwood, WA 98036  
(206) 776-6443

## SOFTWARE DATA MANAGEMENT

**PC-FILE III™**

Easy to use, and one of the most powerful All standard features (search, sort, list plus; browse, global changes, macros, mailing labels, formatted reports with selection and calculations, sub-totals, totals, averages, encryption, Exchange data with 1-2-3, WORD, WordStar, etc. Over 190,000 users. Version 3.0D \$59.95 + \$5 s/h Check, MC/V or VISA. Toll free 24 hrs: 1-800-JBUTTON

ButtonWare, Inc.  
PO Box 5785  
Bellevue, WA 98005  
(206) 746-4296

**PC-FILE/R™**

Next generation offspring of PC-FILE III. All the power of its popular predecessor plus: Relational capabilities, integrated letter writing and mail-merge, context sensitive help windows, "pop up" help, new search retrieves data hundreds of times faster. Ask your dealer for it, or order direct from ButtonWare \$149.95 + \$5 s/h. Check, MC or VISA. Toll free all hours 1-800-JBUTTON. ButtonWare, Inc.  
PO Box 5785  
Bellevue, WA 98005  
(206) 746-4296

**HIGH SPEED DATA RETRIEVAL**

Fax, File, menus, user def data entry form, rpts & tabs & key fields & 100 + keyfields rec/indexed 2 search routines, query lang, ascx export ext, index & print in chars, maxline, avg access .03 sec/rec, floppy, 50mbytes/rechard) unlimited records, msjpc-desc 2.0+ 256k ram 586/833, 386/486 print manual & tutorial, 5 back gear ck, mc, visa, mc



Gryphon Systems  
3410 Pearl, Suite 2702  
Montreal, Quebec H3A 1H3  
(514) 287-1583

## SOFTWARE DATA TRANSMISSION

**TRANSFER 1-2-3™**

Easily transfer your selected data direct from your PC files into Lotus or Symphony. Handles numeric or alpha ASCII data. Has automatic spreadsheet creation & reusable file definitions. Order now & get free copy Function Key Loader utility PC/XT, DOS 2.x. Only 59.95 + 2.50 s/h Call and 6% tax. MC/VISA, Am Exp, company check.

**SOFTMARK**

PO Box 17085, San Diego, CA 92117  
Order: 619/280-2077 (CA), 800/858-0692

## SOFTWARE DEVELOPMENT TOOLS

**SG the SCREEN GENERATOR**

TURBO, BASIC, FORTRAN77, Better Basic, Assembler. Now a Powerful Screen Painter and Data Entry Interface removes all screen display and field manipulation code from your program! SG Interface displays screens in 1 sec. SG has 50 screens/100, 200 fields/screen, color, helps, windows and more! \$125. Turbo Ver. Only \$59! The West Chester Group  
PO Box 1304  
West Chester, PA 19380  
(215) 644-4266

**TURBO FORMS**

Ensure user's input is correct before it reaches your Turbo Pascal program. Treat user input like disk record I/O. Unlimited character and field level data checking, simple one step form creation/modification, flexible formating with graphics, windows, colors and display attributes. IBM PC or compatibles. \$39 only includes \$18 MC/VISA, or C 0.0

**GREAT LAKES SOFTWARE**  
2510 Capitol Ave., Southwest Suite 203  
Buckle Creek, MI 49015  
(616) 962-2017

**TURBOPOWER UTILITIES**

Nine Powerful tools for Turbo Pascal users on PC/XT/AT & compatibles—Pretty Printer, Structure Analyzer, Execution Timer & Profiler, Pattern Replacer, File Differencer, Command Repeater & More. See ads in Byte & PC Tech or call 408-375-3672 for more info. OS/2 \$500 disk & 140 pg printed manual. \$55. W/H source code & theory. \$95. Order toll-free at (US) 800-538-8157 x830, (CA) 800-672-3470 x830



TurboPower Software  
478 W Hamilton Ave., #196  
Campbell, CA 95008

**FIRMWARE PRODUCTION ON PC**

LINK&LOCATE enables PC user to produce ROM-based firmware for 8086/87/186 from object files generated by C, P, PL/I compilers & MASM. Provides full control of segments placement anywhere in memory. Supports output of INTEL hex file for PROGRAMMER & ICE, and MS-DOS EXE file. Includes an INTEL compatible linker, locator, librarian and hex formatter. \$350

Systems & Software, Inc.  
3303 Harbor Blvd., C11  
Costa Mesa, CA 92626  
(714) 241-8650

**DEVELOPMENT SOLUTIONS**

Use your PC as a complete development system. Cross-assemblers target most popular chip families. Debug with AWRM full-screen software simulators and TRICE in-circuit emulators. Turn your code into firmware with superfast AVPROM EPROM programmers. Available for CP/M-80, CP/M-86, PC/DS/MS/DOS host systems. Priced from \$200. Call for details



Avocet Systems Inc.  
PO Box 490-G  
Rockport, ME 04856  
(800) 448-8500, (207) 236-9055

**SOFTWARE****DECISION  
SUPPORT  
SYSTEMS****EXPERT CHOICE™**

Designed for today's decision makers—gain the competitive edge. Facilitates complex decisions based on both objective & subjective factors about criteria & alternatives. Uses procurement, resource allocation, strategic planning, R&D, marketing, finance, employee selection & evaluation. \$495 OEM/DISK \$10



Decision Support Software, Inc.  
1310 Vincent Place—Dept C2  
McLean, Virginia 22101  
(800) 368-2022 (703) 442-7900

## SOFTWARE ENGINEERING

**ENG/SCI GRAPHICS**

OMNIPLOT(S) (screen graphics) & OMNIPLOT(P) (plotter driver) provide integrated engineering/scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible, professional choice of formats: tabular/line, contour, bar, pie, 3-D wire frame & much more! OMNIPLOT(S) \$195. OMNIPLOT(P) \$195. Both \$295.

MICROINCOMPATIBLES  
301 Prudie Drive  
Silver Spring, MD 20901  
(301) 593-0663

**NEW STRUCTURAL DESIGN**

Fast, efficient, versatile structural analysis and design program in spreadsheet format—BEAMS, COLUMNS and FRAMES of any material. Friendly input and output with data storage and COLOR graphics. Specify PC, XT or AT and send \$25 for demonstration diskette to:  
C-Squared B-Squared Software Design Inc.  
763 27th Ave.  
San Francisco, CA 94121  
(415) 751-1337, (800) 621-0851

**CREATE PCB'S EASILY**

Easily create double-sided printed circuit board artwork of up to 17" square using PC-LayOut on an IBM-PC. The artwork is created using a color artwork editor. The final artwork, solder mask and silk-screen/text is produced using either a printer or a plotter. Price \$745. Demo Disk/Manual \$45. DRACO TECHNOLOGY  
7210 Jordan Ave., Suite 050  
Canoga Park, CA 91303  
(800) 235-6646 ext. 646 (outside CA)  
(800) 235-6647 ext. 646 (CA only)

**THE ENERGY ANALYST**

A series of nine complete programs to calculate the performance of shell & tube exchanges, steam heaters, steam condensers, cooling towers, combustion, cogeneration economics, insulation thickness, compressible/incompressible flow, and pipe network flow. Programs are rigorous, flexible and fully interactive. IBM PC and compatibles \$200 for complete set.

**Thermal Analysis Systems Company**  
725 Parkview  
EA Groce, IL 60007  
(312) 439-5429

**SIMULATION**

GPS5/PC is a full-power version of GPS5, the most popular mainframe simulation language. More than just a language, it is a simulation environment specifically designed for interactive use on today's high-end microcomputers. Using GPS5/PC, you can predict effects of changes to real world systems.

**MINUTEMAN SOFTWARE**  
PO Box 171-B Stow, MA 01775  
1-800-233-4340  
1-(617) 891-5652 (MA)

**ATLAS Tutor &**

**ATLAS Syntex Verifier**  
ATLAS Tutor is a menu driven training tool to help engineers learn to generate ATLAS code. ATLAS Syntex Verifier is a development tool to make you more productive off-station. The verifier is menu driven and runs in an interactive or Batch Mode. Both are in accordance with IEEE Standard-716. Price: \$400 each or \$550 for both.

Requires \$100 for the tutor and \$25K for the verifier. DOS 2.0 or later, and two disk drives. **DUBRETT INTERNATIONAL, INC.**  
8856 Glenhaven St  
San Diego, CA 92123  
(619) 277-4700

**BEAM ANALYSIS & SPRG. DESIGN**

**Beam Analysis Prog.** calculates shear moments, reactions, slopes and deflections in beams. Price \$50.00. **Helical Spring Design Prog.** for compression, extension and torsion springs. Price: \$75.00. Both packages include disk and documentation. For IBM PC, PC/386 & compatibles & for Apple II series of computers. 48K required.

**SYLCA CORP.**  
33-47 14th Street  
Long Island City, NY 11106

## ■ BLUEBOOK

### ENG/SCI GRAPHICS PLUS

GRIDS software system for managing 2D data on IBM or Rainbow PCs (PC/XT). Contouring, gridding, interpolation. Fourier transforms (no power of 2 reqd). Large data sets. Screen, printer and plotter support. GRID operations in space and frequency domains. Useful for geoscientists, engineers, surveyors. \$400.00  
Machine Algorithms  
1515-9th Street  
Boulder, CO 80302  
(303) 442-1072

## SOFTWARE EDUCATIONAL

### TEST ITEM MANAGER

Manage your own test item bank on the personal computer. TestSite provides four question formats (Multiple choice, True/False, Matching, Completion) from a single data file. TestSite features flexible selection, shuffling, renumbering, referenced answer keys, and the best formal available. \$139.00  
CLASS I SYSTEMS  
17909 Maple Dept. B  
Lansing, MI 48038  
(312) 474-4664

## SOFTWARE ENTERTAINMENT

### STAR FLEET I

"I call STAR FLEET I the world's most elaborate star battles game"—Jerry Pournelle, Byte Sept. '84. Features full color, music, graphics. Capture ships, lay mines, launch probes, rescue bases, repair damage, eliminate intruders, model 98 ship armaments. Run 102K PC/PCjr, 1 disk, 80 cols., \$49.95 + \$2.50 s/h. Also for TI PC, SANYO MB 555 (192K), C-64, ATARI CYGNUS For CC orders  
PD Box 57825  
(800) 822-4670  
Wheaton, IL 60187  
(708) 486-4163 (in Illinois)

### COMPUTER TRIVIA

Over 1600 questions covering TV, Sports, Movies, Presidents, Science, Literature, Music and Geography. Entire game is in the computer—no books, no gameboard, no spelling required. One or two players. Requires 80-character CRT screen (Monochrome or Color). Send \$29.95 plus. Dealer inquiries welcome.  
WHM ENTERPRISES  
PD Box 484  
Scott Plains, NJ 07076  
(201) 232-0966

### CRYPTOPARM SOLVER

Full featured cryptogram program including built-in editor, disk save/load, printer output, help functions. Unique "create your own" feature. 62 page manual. Sample puzzles included. \$29.95 + \$2.00 shipping. GA residents add 4% sales tax. VISA/MC/CHECK.  
PIEMONT SPECIALTY SOFTWARE  
PD Box 6637  
Marietta, GA 31028  
(404) 474-2318

### TRAIN DISPATCHER

TRAIN DISPATCHER is a realistic simulation of a railroad traffic control center. It was created by designers of CTC systems for operating railroads and is used by some railroads in their dispatcher training programs. Available for IBM PC, XT, AT and Jr. for \$35.00 + \$2.50 s/h. Graphics card required.  
SIGNAL COMPUTER CONSULTANTS, LTD.  
PO. Box 18222, Dept. 33  
Pittsburgh, PA 15236  
(412) 655-7727

### PYLON RACER FLIGHT SIMULATOR

Pylon Racer Thrills & challenges of racing airplane! Color graphics. See your opponent drawn in perspective on screen. Race against yourself or a friend using flight data saved on disk. Optional use 1280 baud modems to race a friend in real time! Demo disk. \$5.00. Pylon Racer: \$44.95 + \$2.50 s/h. VISA/MC.



Mind Systems Corp.  
PO Box 506  
Northampton, MA 01061  
(413) 586-6463

## SOFTWARE FINANCIAL

### MINUTE-A-DAY MANAGER

TAX SURVIVAL SPECIAL. Exclusive SHADOW WRITING feature brings the power of Artificial Intelligence to your record keeping. 256K MS/DOS package includes FREE Custom Calendar Kit PLUS:

- CHECKBOOK/CREDIT CARD MANAGER
- COMPUTER LOGGER • AUTO LOGGER
- Vision/MC (may be tax-deductible) \$59.95 + \$3.95/h
- Myth-Data Management Associates  
PO Box 3333  
Utica, IL 61601  
1-800-255-2255 ext 3300

### INTEREST CALCULATIONS

MA 210 cards, future value, saving fund, present value, annuities, mortgage payments & sched., prin and int., loan payoff sched., affordable loan, actual annual pt. interest with loan points, balloon loan sched. Simple, menu driven. IBM PC/XT/Jr or compatible. \$49.95 + \$7.00 S/H/T/CH/ mo.  
Munier Associates, Inc., Dept. A4  
PO Box 73914  
Houston, Texas 77279  
(713) 784-4348

### DINE BY DISKETTE

Computerized restaurant guide of Manhattan reveals the hot favorites of Wall Street's money makers and other NY glitterati. Cross-matches by location, type of cuisine, and price range. Add your own favorites to the system. No yuppie should be without it! IBM PC & compat. \$18.95 + CT tax. VISA/MC/Check.  
DIGITAL DINING  
PO Box 54  
Southport, Ct. 06490  
(203) 562-2006

## SOFTWARE/ GAMES

### PC/VEGAS GAMBLING GAMES

Poker, Blackjack, Roulette, Keno, Slots. Exact Vegas odds. Includes asset windows to explain your best bets and odds, help windows, cross-game scoring. Graphics not mandatory. Written in C. (MS/DOS) Rev. 1.28K. PC/VEGAS—\$19. Source, games.lib.(50K)—\$39. An excellent way to learn C.

D & H BEAR SOFTWARE  
Box 10793  
Marina Del Rey, CA 90295  
(213) 374-0358

## SOFTWARE

### GENERAL

### SHOP CHEAP—EAT SMART

\*COMPONDIZER—Save more money with your discount coupons and rebates. 64K.  
\*DET ANALYZER—Locate those extra pounds! Tracks calories - 23 nutrients, ideal for menu planning. 128 K. Immediate shipment, 2 week money back trial. \$49.95 ea. + \$2.50 s/h. AmEx, MC, VISA. Call for free brochure.  
NATURAL SOFTWARE LTD.  
7348 St. STE. 7E  
White Plains, NY 10603  
(800) 626-2511, (914) 761-9229 in NY (collect)

### US \$6.00 ... INCLUDING DISK

- IBMPC Light Pen c/w software \$60
  - 64K RAM (set of 8) 150ns NEC 4164 \$39
  - 384K Multi-Function Card c/w FULL RAM \$175
  - BARGAINS FOR HARDWARE/ACCESSORIES/ SOFTWARE
  - 2,500+ Titles for IBMPC from \$6. APPLE—\$5
  - LDTS OF DOCUMENTATIONS VOLUME DISCOUNTS
- Specify your computer. Each huge catalog. \$1 MICRO-WORLD, Dept. PC1  
Tower PD Box 310  
Singapore 9132  
Republic of Singapore

### SAVE \$\$\$—MAKE \$\$\$

Don't pay the high costs for fancy packaging and big name manufacturers. Get the same high quality for a fraction of the price. We have a wide variety of discount software for every application, including many popular titles. All sell for under \$20.00. We are also always interested in expanding our catalog selection. You can earn 35% royalties for doing nothing more than sending your program to us. We do the rest. For free details write:

USERS Software & Programs  
PO Box 301  
Excelsior MN 55331

### DINE BY DISKETTE

Computerized restaurant guide of Manhattan reveals the hot favorites of Wall Street's money makers and other NY glitterati. Cross-matches by location, type of cuisine, and price range. Add your own favorites to the system. No yuppie should be without it! IBM PC & compat. \$18.95 + CT tax. VISA/MC/Check.  
DIGITAL DINING  
PO Box 54  
Southport, Ct. 06490  
(203) 562-2006

## SOFTWARE

### GEOGRAPHICAL

### US-ATLAS

Locates 29,000 cities, with graphic display of states. Compiles Great-Circle distances. Finds all states with cities of the same name. Locates all towns within a given radius. Shows towns 5 mi. either side of a line 40 mi. long. Color graphics or monochrome. IBM-PC/XT/PC/AT/386 DOS 2.0. Send \$39.95 money order or check.



## ILLSTON PC-PROGRAMS

101 Haystall Dr  
Jefferson City, MO 65101  
(314) 635-3417

## SOFTWARE GRAPHICS

### 35mm SLIDE FROM YOUR PC

COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your prints behind. Use high resolution color slides at your next presentation. COMPUTER SLIDE EXPRESS-\$6/slide \$30 minimum order.  
VISUAL HORIZONS  
180 Metro Park  
Rochester, NY 14623  
(716) 424-5300

### FORTRAN/PASCAL GRAPHICS

GRAFMATIC (screen graphics), 70 Microsoft/IBM 2.0 FORTRAN/PASCAL, RM-PROF, DR. SS FORTRAN callable subroutines. Prof graphics power backed up by 16 IBM pc user manual 5 pads in one gen. utility 2-D interactive, total 2-D plot support, 3-D plots, 3-D solid models (hidden line removal) \$135. H-P/H-P Plotter! Try PLATINUM for complete prettier graphics capabilities. Interface w/GRAFMATIC. \$135. Both \$240.

MICROCOMPATIBLES  
301 Prelude Drive  
Silver Spring, MD 20901  
(301) 593-0663

### GRAPHIC PRINTER SUPPORT

At last IBM-PC graphics support for your dot matrix printer. Use the PRIS key to produce quality B&W or color scaled dot matrix reproductions of your display on your Epson, IBM, Okidata, IDS, Centronics, DEC, Analog, Data-south, Gemini, TI B50, Riteman, Toshiba, NEC 8023, C. C. Ioh printer. If your printer is not listed, let us know and we will support it. GRAFLPLUS is now available for all versions of PC or MS-DOS and will operate with IBM, Techmar, and Hercules graphics boards. \$49.95 JEWEL TECHNOLOGIES, INC  
4302 Southwest Alaska St. Suite 207  
Seattle, Washington 98101  
(206) 937-1061, 1-800-628-2828 ext. 527



## ■ BLUEBOOK

### AUTOMATIC CONSULT LETTERS

Easy-to-use program stores Rx's, plus 2000 bytes text on over 12,000 patients. Data printed as consult letter using any of thirty customized letter templates. Names/addresses of referring doctors stored too. Vastly speeds office paperwork and invaluable aid to clinical research. \$189 U.S. plus shipping.

CMS Software Inc.  
4500 Shoregate St. West  
Westmount, Que., Canada  
(514) 989-1806

### THE BEST FOR LESS!

Enjoy the benefits of the most comprehensive software available for doctors using IBM and compatible computers for a fraction of what others charge. NOT JUST INSURANCE FORMS AND ACCOUNTS RECEIVABLE, but superbills, referral and insurance tracking, scheduling, regional PROBLEM ORIENTED MEDICAL RECORDS and more for up to 5 providers. The price: only \$199. Why so much? so little! It was designed by a practicing physician who believes the profession should have the best available tools. It has been proven in offices like yours for over 4 years. Ask about our 30 day return privilege and full telephone support. DR'S ASSISTANT, By MedSoft, simply better at any price you can afford not to try it?

WESTWAVE  
6992 El Camino Real, Ste. 104-345  
Carlsbad, CA 92008  
(619) 753-0259

## SOFTWARE

### MULTI/USER SYSTEMS

### MULTIPLE USERS UNDER PC-DOS

Get four workstations for the price of one PC by using MultiLink Advanced™ in combination with PC-DOS and inexpensive dumb terminals. Using serial ports instead of Klockwork network interface boards, the system forms a single PC, XT or AT into the CPU of a multi-tasking, multi-user network. Includes print spooler, keyboard enhancements, & BBS software.



THE SOFTWARE LINK, INCORPORATED  
8801 Onewoody Plaza, Suite 632  
Atlanta, GA 30338  
CALL: 404/996-0700

## SOFTWARE

### MUSIC

### SONGWRIGHT III

MUSICPROCESSOR prints professional sheet music, with lyrics. Full-screen graphics editor. Transposes to any key, plays tunes. Features multiple staff & voices, harmony, counterpoint bass/treble all time signatures. Requires IBM, EPSON or Gemini printer. \$49.95 (\$39.95 without screengraphics). Send for free sample output. SongRight  
P.O. Box 61107  
Denver, CO 80206  
(303) 691-4573

## SOFTWARE

### MUTUAL FUNDS

### FUNOGRAF©

Graph & find best performing mutual funds or stocks with IBM PC, PCjr, & compatibles. 128K. Graph PRICE and/or MOVING AVERAGE (any span) Superimpose graphs for comparison. Calculate relative strength RATINGS. Generate buy & sell signals when trend changes. FREE into DEMO disk! \$10 FUNOGRAF disk-\$100 MC/M/ISA Parsons Software, Dept. D  
118 Woodbine Drive  
Parkersburg, WV 26101  
(304) 424-5191

## SOFTWARE

### ONE-OF-A-KIND

### FREE SOFTWARE!!

We will give you 10 utilities FREE to introduce you to our new catalog SCREEN BLANKING protects your monitor from image burn. CLOCK, ALARM, NOTEPAD, TIMER, PRINTER, SETUP, COLOR/MONOCROME SELECTS puts up during any program at the touch of a button and more! All you risk is \$3 S/H, the disk is worth that! Act now, offer is limited!

SOFDTUAL  
Swift 225  
219 First Avenue N  
Seattle WA 98109

## SOFTWARE

### PERSONAL

### MEDICAL EXPERT SYSTEM

Sophisticated acute abdominal pain program developed by MD & PhD scientists to assist you & your family in diagnosis of 21 primary medical & surgical conditions based on your symptoms. Be an informed patient. Interesting & unique health care system. \$150 complete with extensive clinical documentation IBM/PC+ come  
Medi-Medics  
7315 Granite Road  
Metairie Park, PA 19125  
(215) 635-6820 or 5820

## SOFTWARE

### PREVENTATIVE MAINTENANCE

### MAINTENANCE & INSPECTION

An easy-to-use computerized method to organize, operate, and control an effective preventive maintenance system. Applicable to any type of business or industry. Full screen input and displays, plus function key help command. Maintains historical data, creates work orders, and provides numerous reports. For info, write to:  
PENGUIN COMPUTER CONSULTANTS  
P.O. Box 20485  
San Jose, CA 95160  
(408) 997-7703

## DISK DRIVE DIAGNOSTIC

Memory Minder, from J & M Systems, is a disk diagnostic program for the IBM PC, PCjr, & IBM compatibles. It checks your drives for head alignment, spindle speed, hysteresis azimuth & more. And, you can use Memory Minder to actually align your disk drives! \$99 plus \$4 shipping



J & M Systems, Ltd.  
15100-A Central SE  
Albuquerque, NM 87123  
(505) 294-4162

## SOFTWARE

### REAL ESTATE

### PROPERTY MANAGEMENT

Comprehensive program for managing residential and commercial properties. Many management reports including operating statement, delinquent rent, lease expiration and transactional register. Provides check writing, check reconciliation, posting of late fees, recurring expenses—\$395 Investment Analysis—\$245

Yard Systems  
3324 State St., Suite "D"  
Santa Barbara, CA 93105  
(805) 987-4245

### PROPERTY MANAGEMENT PLUS

A new easy-to-use system for single or multi-family properties. Prints, checks, rent statements and receipts. Reports—late rents, expired leases, vacancies, income/expenses, and operating statement. Includes a bank reconciliation feature and graphics capabilities! Up to 70% reduction in management time! \$75

REALTY SOFTWARE COMPANY  
1926 South Pacific Coast Hwy #229  
Redondo Beach, CA 90277  
(310) 372-9419

### MONET TOOLS™

Money Tools™ is a comprehensive set of easy to use, menu driven REALESTATE and FINANCIAL PLANNING programs for personal or business use. \$150.00 for complete package. \$15.00 (optional to purchase of PC-DOS) for DEMO-PAC™ and FREE Quick-Calc-Loans™ program. Brochure on request. Requires PC or PC/compatible with PC/MS DOS 2.0+, 128K & 5,000 disk.

VANTAGE SOFTWARE, INC.  
4626 Blue Jay Avenue  
Orange, CA 92669

## SOFTWARE

### RELIGION

### THE SCRIPTURE SCANNER

The Bible encoded on 7 disks. Create reference files of your favorite Bible subjects. Create lesson plans and study guides. Use Windows® for competitive study of text on screen. It's complete! It's innovative! It's useful! Try a Demo for \$15.00. Three popular Bible versions available \$24.95 to \$27.95  
OMEGA SOFTWARE, INC.  
P.O. Box 355  
Round Rock, TX 78680-0355  
(512) 255-9969

## CHURCH SOFTWARE

Church software has entered a new generation! CHURCH III brings you today's most advanced church software. Mailing lists, contributions, member profiles and other modules from \$199. Modular source code provides freedom and flexibility. Demo diskette \$10. Details

**Church Software**

J1 SOFTWARE

P.O. Box 3096  
Beverly Hills, CA 90212  
(213) 464-0625

## SOFTWARE

### SECURITY

### SECURE AT/XT/PC

Control system access, data access! AT/XT/PC Control system board for most popular AT/XT/PC hard disk controllers. Value for AT and XT-compatible 40 controllers segments hard disk by volumes, controls access with passwords, supports hard disk expansion 380-5130 + \$3 shpg. plus CA tax



GOLDEN BOW SYSTEMS  
PO BOX 3039  
SAN DIEGO, CA 92103  
(619) 298-9349

### ADVANCED COPY PROTECTION

The world's leading software manufacturers depend on Softguard copy protection systems. Now Softguard introduces the SUPERlock™—a complete software duplication and copy protection system for your IBM PC. SUPERlock protection stops all copywriters, features full HARD DISK support, requires no special media, no source code changes, and supports over 30 compatibles. FREE demo diskette available

**SOFTGUARD**  
SYSTEMS, INCORPORATED

Softguard Systems, Inc.  
2840 San Tomas Expy., Suite 201  
Santa Clara, CA 95051  
(408) 970-9240

### BITLOCK® SECURITY

Proven effectiveness of powerful multilevel security on IBM PC/XT/AT/Compatibles. TRS-80, Apple & Commodore computers using standard decryption algorithms. Total transparency after easy attachment of small reliable security device to external port. Innovative, yet has survived piracy attempts. \$199.95  
MICROCOMPUTER APPLICATIONS  
7805 S. Wadsworth Circle  
Littleton, CO 80120  
(303) 798-7683 or 922-6410

## ■ BLUEBOOK

### COPY PROTECTION BY MSO

The ULTIMATE diskette copy protection system designed for software developers and publishers. All IBM PC and XT environments are supported which includes DOS, BASIC (compiled and interpretive), Pascal P-System, DBASE II and stand-alone systems. Customized systems available. Requires 54K, two disk drives. MCRO SOFTWARE DEVELOPERS, INC. 2147 West Main St. St. Charles, IL 60174 (312) 377-5151

### THE PRIVATE LINE™

**DATA, FILE & MESSAGE SECURITY**  
Encrypts text, data & programs. Uses US Government Data Encryption Standard. Converts encrypted data to ASCII. Supports pathnames & diskette encryption—1 or 2.64 bit keys. Displays, prints & purges files. IBM PC & Compatibles w/MS-DOS 2.5 X & up/CPM-IV version available. Not Copy Protected. Site License & Dealer Inquiries Welcome. \$49.95, VISA, MC, CommServer 70231001, Telex #5101111/1 EVERETT COMPUTER SYSTEMS PO Box 188 Bain, NC 27808 (919) 923-5621

### XT DATA SECURITY SYSTEM

MagLock secures any type of file and restricts their use to authorized persons. Used with IBM XT or PC with expansion chassis, or any other IBM compatible hard disk system. Secure files, directories, subdirectories or an entire 10 megabyte drive, in minutes, without hardware or operating system modifications. Allows unlimited password selection. Price \$89.00

## MagLock DATA SECURITY SYSTEM

FUDLER SOFTWARE LABORATORIES  
169 Burside  
Towanda, New York 14150  
(716) 693-0584

### PASSWORD CONTROL YOUR PC'S

PC LOCK allows file password and encryption protection. With the lock in place, your computer will not boot without entering a correct PW! Ideal for small multi-user environments. A 5" x 4" card with diskette. 16 changeable passwords. Three versions from \$149. DEB optional. KEEP YOUR PC STRICTLY PERSONAL.



MPPL LTD  
2200 Lehigh Rd.  
Glenview, IL 60025  
(312) 998-8401

## SOFTWARE SPREADSHEETS

### PC-CALC™

This spreadsheet has it all at a popular price. 64 columns x 256 rows, math and stat. functions, horizontal bar graphs, lists locking, individually adjustable column widths. If THEN! link to other spreadsheets or PC-Filer databases, much more. Version 3.0 requires 256K PC. \$59.95 + s/h. Check MC/C or VISA. Toll free 24 hrs.

1-800-887-1011  
ButtonWare, Inc.  
PO Box 5798  
West Des Moines, IA 50606  
(206) 464-4298

## SOFTWARE STATISTICS

### SIGSTAT

SIGSTAT includes over 70 programs of the BMDF statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for unit—e.g., ANOVA, regression + multivariate (e.g., canonical, factor) analyses, time-series, multithreaded crossstab, plots, etc. and more. 8007 support opt. 256K, DOS, 9556.

SIGNIFICANT STATISTICS  
3338 N. Canyon Road  
Privo, UT 84604  
(801) 377-4860

### RATS Statistical Package

RATS brings powerful and inexpensive statistical and econometric computing to the PC. It is a fast, accurate package that performs regression analysis, time-series forecasting, including Box-Jenkins, and cross-sectional analysis, including logit and probit. RATS can read data in many formats, including Lotus WKS files. RATS also offers programming features that provide maximum flexibility and power. Special analysis and graphics are available as options. Requires 256-KRAM IBM or compatible. Base program \$200. Demo including 300 page manual \$40/MC/VISA.

VAR Econometrics  
134 Prospect Ave S  
Minneapolis, MN 55419  
(612) 822-9690

### STATISTICS CATALOGI

If you need statistics for IBM PC or APPLE II, call us and let our technical advisors help you find the statistics programs you need. Write or call now to get a FREE catalog of statistics software. HSD  
9010 Reseda Blvd. Suite 222  
Northridge, CA 91324  
1-800-451-3030/(447) 1-816-993-8536 (CA)

### \$79—STATISTICAL SYSTEM

Menu-driven. Includes multiple regressions, ANOVA (one-way, repeated measures, covariance) Nonparametrics, discriminant, factor, t-tests. Forecasting, Cross tabs, plots. Much more. NCSS-79  
865 East 400 North  
Kayenta, UT 84037  
(801) 546-0445

### TURBO REGRESSION

Ready to run Turbo PASCAL source for multiple stepwise regression, correction, basic statistics. Use your own file description or modify to include in your application. \$139.00 for DOS/0 diskette, documentation and sample data. IBM PCs and clones only. Send check to:

SoftLogic Software, Inc.  
217 East 85th Street Suite 194  
New York, New York 10028  
(212) 517-7751

## SOFTWARE

### TAXES

### TURBO TAX™

"Very easy to use. Documentation is Excellent"—PC Magazine. Powerful and FAST! 33 forms plus multiples. 3 seconds to calculate including all cross-references. Pop-up menus. IRS approved. 1986 tax rates and planning module included. Many extras. Professional version adds 7 forms in-built database, batch output, client letter, time/billing and more. Simply the best at any price! Person's 95. Professional-\$195  
Integrated state returns for most states-\$30/  
\$100.

ChipSoft, Inc.

5674 Honors

San Diego, CA 92122

(619) 453-8722

### TAX PREPARATION

fully interactive menu driven program prepares 1985 Federal tax returns. Fast, easy to use, follows IRS forms incl 1040, sch A-B-R-S-E-W-N forms 2106, 2119, 2210, 2441, 3468, 3600, 3903, 4562, 4797, 4835, 4952, 4917, 5695, 6251. Prints official or subs. forms MS-PC-DOCS 128K, Prof 149K, Personal 100, \$39.95, VISA/MC (\$3.50)  
DUNPHY SYSTEMS, INC  
PO Box 326, Worthington, OH 43085-0326  
614-459-2348, orders 800-522-4070/  
IL 800-942-7317

### TAXAIDE

PERSONAL-1040, 1040A, 2106Z, 2441, 5695, L.A.B.D.G.R.W.IRS worksheets Prints IRS substitutable forms incl 1040 & 1040A. \$29.95  
PLUS—above plus 2119, 3468, 3800, 3903, 4562.5, C20, 2106.2. Prints IRS substitutable forms incl 1040 & 1041A. \$59.95  
Req. 3-3.1-3 or later. 192K, VISA/MC  
Software Applications of Wichita  
2204 Winstead Circle  
Wichita, KS 67226  
(316) 684-0304

### INFO-TAX™ 85

Professional, menu driven, tax preparation & planning software. 52 integrated forms, Schds, Wkshrs, FASTEST TAX PACKAGE AVAILABLE!  
Tax Planner. Use overlays, prepared, or computer-generated IRS approved forms. Integrated DC-ILL/MO/IL/PA/NV/VA modules. \$250. INDIVIDUAL Ver only \$65 DEMO \$10 AMEX/VISA/MC Rec. 250K  
CRS, Inc.  
5712 Magic Mountain Drive  
Rockville, MD 20852  
(808) 622-4070, (800) 942-7317 in ILL.

### IBM PC LOTUS TAX TEMPLATES

1985 1-2-3/Symphony Tax Templates Option  
1-1040, A-E, G.R, SE, W, 2106, 2441, 3468, 4562,  
5695, 256K, 3468, 520 Option 2, Above plus 7,  
2119, 3903, 4138, 4684, 4835, 4952, 4972, 6251,  
320K/448K, \$32 Professional, 32 forms incl all  
above, \$34K/512K, \$50. IRS Accept. Menu  
driven VISA/MC  
SIRON-TAX  
13445 SW CRESMER DR  
TIGARD, OR, 97224  
(503) 655-2743

### ALL FORMS TAX SOFTWARE

Complete Federal Income Tax software that computes forms 1040, 2106, 2119, 2210, 2441, 3468, 3903, 4136, 4562, 4684, 4797, 5695, schedules A, B, C, D, E, F, G, R, SE, W Prints all forms and schedules  
SUGGESTED LIST \$149.95  
(DEALER INQUIRIES)  
UNIQUE COMPUTER SYSTEMS  
140 East Commonwealth Ave #208  
Fullerton, CA 92632  
(714) 525-7118 (1-800) 331-5088 in CA.

### TAX-PREP 5.95

123 Symphony Macro-driven Tax Prep 1440, A-G, SE, W, 2106, 2119, 3903, 2441, 3468, 4562, 4684, 5695. Follows IRS forms layout. Taxable Inc & tax liability continuously displayed. Facilitates choosing options to minimize tax. 384K/512K, 15% - 95 + \$2.00 [Ca Res add 6% Tax] Money Order. Check or Cash  
MYKRO-KOSIM  
1790 Lakeside Dr  
Fenton, Ca 95018  
(408) 335-7396

### TAXFREE 85

TAXFREE 85 provides easy return preparation for the tax preparer. Screen display of IRS forms eliminates worksheets, so you work directly on the tax form with no training required beyond the ability to manually prepare a return. Built-in Help commands eliminate reference to IRS instructions or training manuals and provide fast accurate results without the aggravation and delay of external databases. Unlimited database and multiple forms included. Laser printing available. Pays for itself in the preparation of few returns  
\$99. Demo \$35  
Echo Systems Inc  
PO Box 15496  
New Orleans, LA 70115  
504-656-6123 or 800-332-2829 in La 1-800-874-1614

## SOFTWARE

### TERMINAL EMULATION

### MicroGate BSC EMULATION

Our MicroGate family offers complete BSC emulation. MicroGate/WS provides both remote 3270 & RJE links. MicroGate II is a programmable BSC subsystem in COBOL, C, BASIC, etc. MicroGate 2780/3780 is now the standard to which other PC/RJE links are compared—all come with our unparallelled customer support!  
GATEWAY MICROSYSTEMS  
9591 Capital of Texas Highway, Suite 105  
Austin, TX 78759  
512-345-7791

## BARR/HASP INTELLIGENT RJ41E WORKSTATION

Bundled hardware and software for IBM PC, XT and AT. Transmits data to host and receives output simultaneously. Emulates IBM 3772-2 and HASP on IBM 360/20. Line speed: 1200 to 19200 baud (56 KB on AT). Supports multiple high-speed printers beyond 2400 lpm (7000 lpm on AT). Features menu-driven printer terms control, plotter support, unattended operation, easy installation \$899 complete.

**BARR SYSTEMS, INC.**  
Suite M, 2600 NW 41st Street  
Gainesville, FL 32606  
(800)-849-5751/(304) 371-3650

## TC-LINK 3270 & 5251

A full line of remote 3270 & 5251 Emulators available. All remote units manufactured by Tresyscom. The Emulators can be used on all IBM PCs in single or cluster configurations. Features: Multiple Host and printer sessions, Hot Key, File Transfer, Multiple LU's, SNA, X.25 & BSC/ISDN. Prices from \$699.00.  
**TRESYSCOM**  
74 Northstar Blvd.  
Nashua, NH 03062  
(603) 863-0556

## VT 100 on PC JR, XT, AT.

ZSTEM-VI 100 Smart Terminal Emulator  
132 columns by windowing--no addl. hardware. Double High Double Wide Characters. Complete VT 100 line graphics & Smooth scroll. Full keyboard keysets/MACROS. International Font Support EGA Support. File transfers ASCII,XMODEM, KERMIT. Rates to 38.4KB \$150.00 4094 Option \$99.00. Quantities dealer discounts available. 30 day money back guarantee. MC/VISA accepted



**KEA SYSTEMS LTD.**  
#412-2150 W Broadway  
Vancouver, BC, Canada V6K 4L9  
Support (604) 732-1191 TLX4-352B4 VCR  
Toll Free Order Line (600) 663-8702

## SOFTWARE TRAINING

### YOUR KEYBOARD GOTCHA?

Don't miss the benefits of Dvorak another day. SunStroke™/Dvorak gives you sophisticated keystrike translator for DOS applications, superb Dvorak typing Coach, self-motivation audio cassette, transfer letters, keytop puller, manual \$95.00 plus \$4.00 shipping, VISA, MC, AMEX, check. You can stroke the Dvorak today! Seasoned Systems, Inc.  
Box 3720  
Chapel Hill, NC 27515  
(800) 334-5531 (919) 732-9391

## SOFTWARE TYPESETTING

### HIGH-TECH TYPESETTING

Transmit your text via toll-free lines directly to our fully automated typesetting system. \$2 per K characters with a \$.5 minimum. Same day service. 200 typefaces in sizes up to 72 point. Send \$15 + \$3 shipping for our 220 page guidebook, or call toll-free and use your MC, VISA or AMEX.

**INTERGRAPHICS INC.**  
1064 South Columbus Street  
Alexandria, VA 22314  
(800) 368-3342 or (703) 663-9414 in DC area

## SOFTWARE UTILITIES

### SMARTWARE International, Inc., introduces

- DISK MANAGEMENT FACILITY (DMF) including
  - FILE SUPPORT FACILITY (FSF)
  - Cosmetically appealing display of up to 24 files at a time.
  - Single character entries to perform the following:
  - Erase multiple files (up to 24 at a time);
  - Erase multiple files (up to 24 at a time) previously erased with this facility;
  - Erase a complete directory of files and/or disk;
  - Change file attributes;
  - Type ASCII files to the screen;
  - Select a directory for display;
  - Browse files with update capability-view ASCII & HEX data (including hidden & system files);
  - Dump viewed files to print while selection in an easy to read functional format;
  - Run EXE, COM & BAT files;
  - Execute DOS commands;
  - Name, move or copy up to 14 files at a time, placing each in a different subdirectory or drive if desired;
  - An extremely functional tool for users and technical personnel alike
  - A true value \$49.95 (for both facilities) or priced separately at \$39.95 each.
- MC/VISA

**SMARTWARE International, Inc.**  
759 Avery Street  
South Windsor, CT 06074  
(203) 646-2616

### CO-RES PRINTER UTILITY

Printer Features Co-resident, uses 8k, issues printer set-up commands for dot matrix printers from keyboard. Pop-up menu selection. Sends line feed, form feed, compressed print etc. with one keystroke. Up to 14 commands. Supports most printers. Netcopy compatible. VISA/MC No COOS \$19.95 + \$2.00 S/H.  
T.A.G.  
(805) 569-3710  
3463 State St #342  
Santa Barbara, CA 93105

### PROGRAM POWER!

Write better programs with Complete Super Utilities™ by PMS. Macros, windows, backups, recover files, find files, test, hide, encrypt & decrypt files. Password & copy protection, DOS commands for disk, graphs & much more! Over 75 programs + our fantastic manual for only \$69. Call for all the details VISA/MC  
**PLACE MANAGEMENT CORP.**  
50-116th Place  
Woodside, NY 11377  
(718) 651-6700

### EASY AIM-30 day trial

Installs your programs on a hard disk and creates subdirectories, paths, and displays programs in a menu, all automatically. Features include time log, backup to floppy or tape, copy files by menu, floppies to/floppies/between menu selected directories. DOS is transparent to end user. Powerful yet simple \$84.95

**LARSON SYSTEMS, INC.**  
BOX 193  
STORY CITY, IA 50248  
(515) 733-2717

### EXIM UTILITIES

Assembler Subroutines for Compiled Basic Programs

- \* Write to screen at assembler speed \* Scroll down/up (even within a window) \* Determine current directory, DOS \$0, free default drive space \* Hide/windows a file \* Verify option on/off Enhance your applications \$10.00 + \$2.50 S/H. Checks or money orders to:  
**EXIM Services of N.A. Inc.**

P.O. Box 5417  
Clinton, NJ 08809 201-735-7640

**IIBM USES CP/M OISKSH**

"The best CP/M to DOS converter" PC mag, 4/85 IBM transfers files, formats, reads and writes DIRECTLY to 120+ CP/M disk formats on your IBM PC, XT, AT (also 96 TPI & 8") Uses normal DOS commands. Next day shipping. Dealers invited. Uniform by Micro Solutions \$59.95 + \$3 S/H MC/VISA, check, CCO, no PO's  
Business  
100 S Second St  
Debtore, Illinois 60115  
(708) 758-2355

### FREI MENU SYSTEM & CATALOG

Menus! (our FREE! intro product) lets you organize programs, BAT files, etc. into attractive or more menus. Supports cross device & sub-directory access & works w/ network resources. With Menus! you get our FREE! Catalog 2/100s of FREE! programs and utilities like PCTYPE, IPNTCHK, WP etc. You pay for media/shipping only! Order now! Send only \$10.00 to:  
**FREI SOFTWARE CO.**

714 East Maple Avenue  
Orange, CA 92666

### LASERITIVE

Loadable device driver translates any file to laser printers via SCSI, Background or foreground. Uses Xon/Xoff protocol. Also ASCII file listing, line printer emulation. Use Apple LaserWriter, Imagen, DMS, HP LaserJet Plus, PostScript, etc. MSDOS 2.1/ later \$49.95 + \$2.00 S/H.  
TEXTSET, Inc.  
PO Box 7993  
Ann Arbor, MI 48107-7993  
(313) 998-3566

### TOSHIBA-IBM COMPATIBILITY

Print your Toshiba printer totally compatible with the IBM (and compatibles) in both text and graphic modes. 107's IBM-Toshiba Printer Interface has Econ. emulation / Toshiba quality. Screen dumps, IBM upper ASCII chars, font design. Downloadable font capability for P1340 and P1350. \$79.95 (32.50 S/H) MC/VISA  
**INTEGRATED DATA TECHNOLOGIES, INC.**  
4779 Bucyrus Lane  
Colorado Springs, CO 80917  
ORDERS 303-488-2583

### HARD DISK DIRECT ACCESS™ 4.0

The Ultimate Hard Disk Menu System. Organizes your software programs into a "User defined" menu/system. Features single key stroke access, time usage tracking, custom applications, and much more. Order today! 30 day money back guarantee



**Delta Technology International Inc.**  
P.O. Box 1104  
Eau Claire, WI 54702  
To order 1-800-242-MENU  
For Mass Info 715-832-0598

### 4 UTILS EVERYBODY WANTS!

Why pay more for these valuable utilities?  
• RECAPTURE - get back those lost disk files  
• MACRO - use one key to perform many strokes  
• TURBO - create fast Disk with memory  
• SPEEDER - never let your PC to print.  
Get them all from the ultimate source. Just \$49.95 MC, S/H incl'd. MC/VISA readers add 6%.  
AlfordSoft  
5118 Belmont Street  
Laguna Beach, CA 92651

### EASY LASER PRINTER SETUP!

SetIP or CanSet. Simple menu-driven and/or batch utilities allow full control over HP LaserJet or Canon Printers. Supports ALL cartridges. Control margins, page count, LTR, CR, lines/page, etc. MC ESC CODES! Network compatible. Over 150 commands. Low cost \$19.95. S/H. MC/VISA  
W/ SetIP Only \$49.95 + \$4 S/H. Visa/MC/Check

**Orbit enterprises, inc.**

**DIRECT ENTERPRISES INC.**

P.O. Box 2875-M  
Glen Ellyn, IL 60138  
(312) 469-3460

### SCROLL AND RECALL

A resonant screen and keyboard enhancement utility. It captures the data that goes off the top of your display screen and allows you to scroll back through this data or save it to a disk file. Also saves your DOS commands as you enter them and allows you to recall, edit and re-enter previous commands without retying. \$69  
OPT-TECH DATA PROCESSING  
P.O. Box 678  
Zephyr Cove, NV 89448  
(702) 568-3737

## ■ BLUEBOOK

### PALOCK/PALOCK II DISKS

PALOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands \$99 PADLOCK II disks come preformatted with finger-print and serialization. PADLOCK II disks offer superior protection. Ask about our PRIVATE TALK product. All work with hard disk, EXE, COM files and all DOS versions MC/VISA, GLENCO ENGINEERING, 3620 Ridge Ave, Arlington Hts, IL 60004 (312) 392-2492.

### COPY II PC

Copy II PC is the backup insurance you need to protect your software investment. Copy II PC makes floppy backups of most protected software quickly & easily, and even allows several to be run from a hard disk without a floppy in AT (Call for current list) For IBM PC, XT, AT, 386/387 Jr. Also available for Apple II, Mac, C64 \$39.95 + \$3.95 (VISA/MC/Check)

## Central Point Software INCORPORATED

CENTRAL POINT SOFTWARE, INC.  
9700 SW Capitol Hwy., #1008  
Portland, OR 97219  
(503) 244-5782

### PEEK'S 'N POKE'S . . . and more!

Thousands of programmers enhance their programs and save time with PEEK'S 'N POKE'S! The disk (56 programs) & manual show you how to access and modify system status, perform DOS & BIOS function calls from BASIC or Pascal, and much more for only \$30. Want more? A perfect companion package, THE INSIDE TRACK, gives your programs assembler-coded speed plus control over the keyboard, memory, programs, etc. Disk (61 programs) & manual for just \$45 Shipping \$2.50 (via MC/VISA).

### DATA BASE DECISIONS

14 Bonnie Lane  
Atlanta, GA 30328

(404) 256-3860 (800) 722-7006

### AT/XT/PC HARD DISK EXPANSION

Replace hard disk with a bigger one, or add a second hard disk! Virtually supports high-capacity drives on standard AT, XT, and compatible hard disk controllers. Includes multiple volumes, security features, selectable clusters, keyboard lock, \$80-\$120 + \$3 shipping + CA tax.



GOLDEN BOW SYSTEMS  
PO BOX 3039  
SAN DIEGO, CA 92103  
(619) 296-5349

### dBASE MULTI-USER UTILITY

dNetwork is a program that locks and unlocks both records and files for dBASE II/III to create a pseudo multi-user environment. The locking commands are in dBASE source code and are written into the program. Complete with diskette and technical HELP manual. ONLY \$99.95 + SHIP.

MARKET LINE INTERNATIONAL, INC.  
One Essex Street  
Hackensack, NJ 07601  
(201) 646-0225

### WINDOWN FOR "dBASE III"

"dWINDOWN" is a unique utility program (9K) that dramatically enhances the screen presentations of dBASE by "patching itself into memory and adding a series of new commands and functions to the dBase repertoire. Using these commands, the user can quickly and easily develop menu-driven programs, create on-line lookups, and simply spruce up their "dBASE" menu and data entry screens. "dWINDOWN" is a program that is absolutely magic and dazzling, not to mention right fun", says Data Based Advisor. Requires DOS version 2.0 or above and IBM, PC, XT, AT or compatible. Cost \$99.00 plus shipping.

## LIBERTY BELL SOFTWARE

Liberty Bell Publishing  
618 W. Glisan, Suite 203  
Portland, Oregon 97209  
Toll Free: 800-547-3000 (Dept. 606)

## SOFTWARE

## WORD PROCESSING

### PC-WRITE™ TRY IT \$10

Fast, friendly, flexible features: mail merge, index, table/contents, toolbars, keyboard macros, windows, Help screen, manual, quick ref card. Try disk with manual and software \$10. Register for support, updates, and newsletters \$75. Shareware legal to copy and share with others. VISA/MC.

Quicksoft  
219 First North #24c  
Seattle, WA 98109  
(206) 282-0452

### CHECK YOUR SPELLING AS YOU TYPE!

The Resident Speller™ sounds the bell when you type an incorrect word. Works with most word processors. Turn on or off checking and add words to an alternate list with the touch of a key. Requires 90K in addition to word processor with 49,000 word dictionary.

The Resident Speller™ \$29, demo disk \$2. S&K TECHNOLOGY INC. DEPT 10  
4610 Spotted Owl Road  
San Antonio, TX 78249  
(512) 492-3394

### WORD IMAGE

Edit 4 files, undo, sub-directories, big files, macros, on-screen attributes, command driven, batch files, search/replace in ranges, on-line help, most printers, indexed manual with tutorial, fast, MORE. Needs 320K, PC/DOOS 2.0+ and 1 DSDD drive. Intro \$50, 30-day trial.

SOFTWARE (DEODOG)  
POB 305  
Brooklyn, NY 11204  
718-236-3875

### CONTEXT WORD PROCESSOR

Full featured, professional grade, word processor for IBM PC/XT/AT/150+ features: Full screen, What you see is what you get, On-screen page formatting, Easy to learn/use, 150 context sensitive help screens, includes 200 page reference manual own disk, VISA/3C 30 day money-back guaranteed! Only \$69.95.

DDK SOFTWARE  
PO Box 450729  
Atlanta, Georgia, 30345  
(404) 934-6010

### ESCRIBE EN ESPAÑOL?

Escríbelo, the first Spanish spelling checker works with DOS, CP/M and most word processors. Features as in best English checkers but designed for Spanish. Includes on-line verb conjugation. Orders ONLY with VISA/MC 99.95 through 12/85, demo 14.95

IBIZONIC  
PO Box 3455  
Trenton, NJ 08619  
609-890-1495

### MY WORD IS JUST \$35

Emulates wri. Full-featured, full screen word processor for IBM PC/XT/AT/150+ or compatibles. Wizards, search/replace, block ops, headers & footers, sort, adds row/column, calculator, macros, merge/print, quick print, 256 CHARs. Allows color & customizing 100+ ops, won't lose text, utilities, translate wks files to ASCII or back. Help screen, printed manual (index/table of contents), fully supported. Source add \$35 DOS 11-13, 128K, 1 drive, uses any printer, 30 day money-back guaranteed!

TNT SOFTWARE INC.  
34069 Hainesville Road  
Round Lake, IL 60073  
(312) 223-0632

### PC-OUTLINE

SUPER-OUTLINER Fast, easy pull-down menus, Memory resident option (like Sidekick). Automatic numbering, Advanced editing capabilities, Multiple outlines/Windowing, Hide/Unhide any portion. Choose by many over ThinkTank Shareware, can copy and share with others \$49.95 disk and documentation.

SOF WORKS DEVELOPMENT  
750 Sheepin Road #142  
Mountain View, CA 94033  
(800) 446-2263

### WORD FINDER™ IMPROVE YOUR WRITING BY FINDING THE PERFECT WORD FAST!

An electronic thesaurus, Word Finder allows users an instant view of synonyms in a pop-up window (RAM resident, like Sidekick) for immediate word replacement with a simple keystroke. Contains 90,000 synonyms for 5,000 words. You may change word processors as many times as required, from any of the following: Word Star 3.0 to 3.31, WordStar 2000, Multimate, Word Perfect, PLS Write, Microsoft Word, IBM Writing Assistant and Easy Writer II, more to follow. Compatible with IBM PC and compatibles and CP/M based computers. Order today at our introductory price of \$79.95 and save a bundle off the regular price of \$124.95.

## WORD FINDER™ SYNONYMIC FINDER

A Computerized Thesaurus

WRITING CONSULTANTS  
300 Main St. Suite 438  
E Rochester, NY 14445  
1-800-828-6293  
(716) 377-0130 (in New York State)

### PC-TYPE™

The easy-to-learn, easy-to-use word processor. Written entirely in Assembler, it's fast, compact, & capable. Help panels, hands-on tutorial program, macros, multiple line headings & listings, DOS path support, print spacing, block operations, much more. Uses ASCII files. Install program allows customization. \$59.95 + \$5 s/h. Check, M/C, or VISA. Toll free 24 hrs. 1-800-247-1111.

ButtonWare, Inc.  
PO Box 5786  
Bellevue, WA 98006  
(206) 746-4296

# The power behind the glory

Primavera Project Planner gives successful project managers the three things they want most...control, control, control.

What they like, you'll like...

Our capability for managing projects up to 10,000 activities. Resource leveling and cost management. The ability to compare current schedules to targets and to perform "what-if" analysis. Plus, standard and custom reports to give you the who, what, when, where and why in virtually any format you need.

You can even produce high quality bar charts and network logic diagrams using our optional graphics package, Primavision.

**Power by the hour.** For high intensity, short duration projects, Primavera now offers Finest Hour™.

It gives you everything you get from Primavera Project Planner, plus the capability for hourly scheduling and multiple calendars. Interested? Contact us for more information or the name of a nearby Primavera dealer.

**Primavera Project Planner™...the most project management you can get from a micro.**

Primavera Project Planner is now available for VMS™  
on DEC/VAX™ and for MS-DOS™ on IBM™ PC  
and compatibles.



**PRIMAVERA SYSTEMS, INC.** Suite 925 • Two Bala Plaza  
Bala Cynwyd, PA 19004 • (215) 667-8600 • Telex: 910 997 0484

CIRCLE 187 ON READER SERVICE CARD

PC MAGAZINE ■ FEBRUARY 11, 1986

288

# YOUR BACK-UP SYSTEM FOR ADVANCED PC INFORMATION



As an IBM PC expert, you're the source of information on IBM PCs.

But when you need answers, where do you turn?

TURN TO PC TECH JOURNAL —you can depend on it every month for the most authoritative coverage of innovative applications, systems design, and technical information.

Save 47% off the single copy price of \$47.40.  
One year [12 issues] only \$24.97.

Use the coupon below, or call  
**1-800-852-5200**  
toll-free

82A44

**TECH JOURNAL**  
P.O. Box 2966  
Boulder, CO 80322

**YES!** I want to subscribe to PC TECH JOURNAL for one year [12 issues] for only \$24.97—nearly half off the one-year single copy price.

Mr. / Mrs. / Ms. \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Savings based on full one-year [12 issues] single copy price of \$47.40.

Check one:

Payment enclosed    Bill me later

Charge my:

American Express    Visa    MasterCard

Card No. \_\_\_\_\_

Exp. Date \_\_\_\_\_

Please allow 30 to 60 days for delivery of first issue.



# GET FREE INFORMATION!

Of all the products advertised in this issue of PC Magazine, there are dozens you'd probably like to know more about. Handfuls you might be interested in buying.

Now you can have pertinent, comprehensive information about these products right at your fingertips, and it won't cost you anything. Only a minute of your time.

The manufacturers and distributors of these products have colorful and informative literature available. If you're interested in receiving these brochures, PC's Reader Service Program can help.

Simply follow the instructions described below and PC will forward your requests for information to the appropriate advertisers. Before you know it, you'll have a complete and handy product reference file.

While you are looking through PC Magazine take advantage of this handy flip-open card to circle the numbers as you see products that interest you.



Getting free information about products advertised or mentioned in this issue of PC is as easy as 1-2-3.

**1.** Each ad in the magazine includes a reader service number. (These numbers are repeated on the advertiser index, as well.) If you'd like more information about the product or products described in a particular ad or feature, circle the corresponding number on the attached card.

**2.** Fill in your name and address in the space provided. Please: only one card per person.

**3.** Mail the card today...it's postage paid. And watch your information file begin to grow.

NOTE: This card is to be used for product information or subscriptions only. Editorial inquiries should be directed to PC Magazine, One Park Avenue, New York, NY 10016.

Now is also an ideal time to become a PC subscriber. See the back of this card for details about our special offer for new subscribers.



**IF YOU ARE A  
PROFESSIONAL PC  
USER...**

**IF YOU SEE THE  
PC AS AN INVESTMENT  
OR IMPORTANT  
BUSINESS TOOL...**

**IF YOU WANT TO  
MAXIMIZE YOUR PC  
PRODUCTIVITY...**

**HERE IS A SPECIAL  
OFFER YOU WON'T WANT  
TO MISS!**

Now you can receive one year (22 issues) of PC Magazine for only \$22.00—save 66% off the single copy price!

The money PC will help you save will cover the cost of your subscription more than ten times over!

How?

In PC Magazine, you'll find in-depth and thorough product reviews that will help you make informed and appropriate buying decisions.

You'll learn about innovative applications... project management, communications and graphics... and how to put them to use on your PC.

You'll hear industry news first-hand, and how forward-thinking professionals are using their PCs to further their business goals.

What's more, you get all this information every two weeks, giving you a decided edge over colleagues who rely on a monthly publication.

Your subscription to PC is your guarantee of the most up-to-date and comprehensive coverage of innovations and applications that will help you maximize the performance of your PC.

So don't miss out. Act now on PC's special offer and get one year (22 issues) for only \$22.00. Fill out the attached reader service card and check the subscription box. Or, call toll free, 1-800-852-5200.



# Pushy, pushy, pushy.



## RESIDENT™ MOVE FROM PROGRAM TO PROGRAM WITH THE PUSH OF A KEY

Now you can go from application to application in a single key-stroke. With RESIDENT™ the product that makes different programs memory resident in your PC. Just name your own key to access your application.

**SAVE TIME 26 WAYS.** No more waiting to change programs. Go from Lotus 1-2-3 to Wordstar to DOS and back again. RESIDENT gives you instant access to as many as 26 programs. And ends stopping, searching and loading diskettes during the workday.

**CUT AND PASTE.** Take data (CUT) as it appears on the screen from any application and transfer it (PASTE) to any other application. For example, move columns from your spreadsheet to your word processor.

**SOMETHING EXTRA. DESKTOP PROGRAMS.** Desktop programs are simply another application for RESIDENT. Included free is Utility Package I, which has these programs: NOTE PAD, PHONE DIALER, CARD FILE, BASE CONV., CALCULATOR, ASCII TABLE, COMM. TERM., AND MESSAGE PAD.

**AT A PRICE THAT'S NOT PUSHY \$89.95.**

RESIDENT does a lot. But it doesn't cost a lot.

And ordering it is almost as easy as using it. Just push a few buttons.

INFORMATION SOFTWARE, INC.

2639 Walnut Hill #135

Dallas, Texas 75229

For more information, call

(214) 353-2966

IBM compatible, IBM PC, XT, AT, and 286 compatible

PC-DOS 2.0 or higher, one 3.5" 1.44 MB disk drive

Two floppy disk drives recommended. Memory requirement: 128K required per program (memory requirements apply)



Send this coupon with your credit card number (VISA, MASTERCARD), money order or check for \$89.95 plus \$5.00 for postage and handling. In Texas, add 6 1/4% sales tax (\$5.51). Outside the U.S. add \$10.00 (to U.S. Bank) for postage and handling. No C.O.D. please.

CHECK     MONEY ORDER     VISA     MC

NAME \_\_\_\_\_ EXP DATE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

PHONE NO. \_\_\_\_\_

RESIDENT™ is a trademark of Information Software Inc. IBM, PC, XT, AT are registered trademarks of International Business Machines Corp.

128K US 1.25 is a registered trademark of Compaq Computer Corp.

Lotus Development Corp. Shareware is a registered trademark of Shareware International Corp.

In the tradition of  
Samuel Morse's telegraph,  
we've created an easier  
way to dash off messages  
on your computer.

In 1844 Morse tapped out a series of dots and dashes on his new telegraph, and the message "What hath God wrought?" traveled instantly between Washington D.C. and Baltimore. Telecommunications was born. Today, we've teamed our new 1200 bps modem with Microsoft's® Access software, and telecommunications has come of age.

Making information easier to send and receive was the reason we designed the Kyocera modem for the IBM PC, AT, XT\* and compatibles. That's why we gave it 8K of intelligence for a variety of time and money-saving functions. Like unattended operation, busy and dial tone detection, 11 result codes, and help menus.

Then we teamed it with today's most advanced communications software, Access by Microsoft.

Access is the communications program with X.PC, the amazing protocol that allows you to open 15 live connections over a single line while actually viewing 8 of them simultaneously through "windows" on your screen. At the same time, it automatically checks for data errors during transmission. In addition, Access has built-in interfaces for the information services you need, like CompuServe® and Dow Jones News/Retrieval®. And the Access Learn command turns long command sequences into one-stroke functions that quickly get you on your way to solving problems and doing business.

So get the communications package that makes it easier to get the business information you need. The bundle includes modem, Access software, all accessories, and even the RS-232C cable (for IBM PC, XT and compatibles).

It's a system even Sam Morse would be proud of.

 **KYOCERA Modems**  
A tradition of innovation.

For your nearest Kyocera dealer, call toll-free (800) 235-1222 or (408) 257-8000.

©1989 Kyocera International, Inc., Milpitas, CA 95035. \*IBM PC, AT, XT are registered trademarks of IBM Corporation.

CompuServe is a registered trademark of CompuServe, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones, Inc. IBM PC, AT, XT are registered trademarks of IBM Corporation.

CIRCLE 189 ON READER SERVICE CARD



The 1844 Morse telegraph. With it,  
Samuel Morse revolutionized telecommunications.



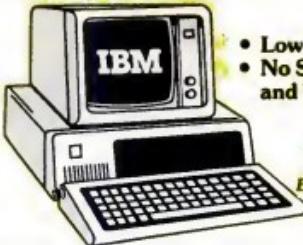
Microsoft Access with X.PC  
allows multiple live connections.



# Save

**1-800-231-9842**

WESTERN REGIONAL ORDERS



- Low Low Prices
- No Surcharge for MasterCard and VISA

**1-800-237-4048**

EASTERN REGIONAL ORDERS

These Fine Corporations, Universities and Companies Put Their Trust In "COMPUTER MART"

ATT	American Savings	University of:
3M	Landmark Mortgage	California
Magnavox	American Nurse Assoc.	Illinois
Eaton	Dun & Bradstreet	New York
Merrill Lynch	U.S. Navy - Army	Colorado State

Put Your Trust In COMPUTER MART

### • COMPUTERS •

IBM ENHANCED AT	4928
IBM ENTRY LEVEL AT	3241
IBM PC, 1 DSDD DR, 256K	1702
IBM PC, 2 DSDD DR, 256K	1826
IBM PC, NO DRIVES, 64K	1316
IBM PC, 2 HALF/HYTE 256K	1702
IBM XT, 1DSDD DR/10MB, 256K	3355
IBM XT, 1DSDD DR/TA HD, 256K	2491
COMPAQ, 2 DSDD, 256K	2173
COMPAQ PORTABLE 2 MODEL 2	5292
COMPAQ DESK PRO MODEL 3	3304
COMPAQ DESKPRO MODEL 2	2156

### • MONITORS •

AMDEK 300G	119
AMDEK 300A	133
AMDEK 310A	149
AMDEK 600 RGB COLOR COLOR	409
AMDEK 710 SUPER HI RES COLOR	447
IBM COLOR	616
IBM MONOCHROME	235
PRINCETON MAX-12 E	160
PRINCETON HX-12 RGB COLOR	446
PRINCETON SR-12	575
PRINCETON HX-12E COLOR	510
QUADRAM AMBER- CHROME	150
QUADRAM QUADCHROME II	426
AMDEK 722	510

### • DISPLAY CARDS •

STB SUPER HI RES 400	409
HERCULES COLOR	151
IBM MONOCHROME	218
IBM COLOR	230
EVEREX GRAPHICS EDGE	263
EVEREX THE EDGE	243
GENOA SPECTRUM	289
TECMAR GRAPHICS MASTER	467
PARADISE MODULAR GRAPHICS	274

### • BOARDS •

AST SIX PACK PLUS, 64K	218
AST MEGAPLUS, 64 K	265
AST MP-2, 64K	232
AST ADVANTAGE, 128K	391
AST I/O PLUS	122
JRAM-2	156
QUADRAM QUADBOARD OK	186
QUADSPRINT	423
TECMAR CAPTAIN, OK	162
TECMAR FIRST MATE, OK	200
TECMAR WAVE XT, 64K	187

### • MODEMS •

HAYES 2400	638
HAYES 300	138
HAYES 300/1200	407
HAYES 1200B w/SOFTWARE	386
HAYES 1200B	351
VENTEL HALF CARD	381
VENTEL 300/1200 INTERNAL	347

AST REACH HALF CARD  
1200 ..... 363

### • PRINTERS •

OKIDATA 83A, WIDE CARRIAGE	554
OKIDATA 84P, WIDE CARRIAGE	672
OKIDATA 2410P	1814
OKIDATA 182	215
OKIDATA 192	376
OKIDATA 182S	259
OKIDATA 84	672
EPSON FX-80 TRACTOR	371
EPSON LX-80	241
EPSON FX-185, WIDE CARRIAGE	541
EPSON FX-100, WIDE CARRIAGE	531
EPSON JX-80 COLOR PRINTER	541
EPSON LQ-1500 PARALLEL	940
NEC 2050	694
NEC 3550	1058
NEC 8850	1478
JUKI 6300	698
JUKI 6200	503
JUKI 6100	362

### • ACCESSORIES •

NEC BI-DIRECTIONAL TRACTOR	151
NEC CUT SHEET GUIDE	63
JUKI 6100 BI-DIRECTION TRACTOR	105
JUKI 6300 BI-DIRECTION TRACTOR	122
MEMORY, 65K CHIPS	8
MEMORY, 256K CHIPS	39
PRINTER CABLE	10
MICROFAZER BUFFER, 8K	131
BERNOULLI, 2 DRIVE	2615
BERNOULLI, 1 DRIVE	1790

# Save

Call for non-advertised and lower current prices. IBM is a registered trademark of International Business Machines. Prices subject to change. We accept all major credit cards, money orders, and personal checks. 2% surcharge for shipping, handling and COO. Add 10% for air freight and 15% for express. Returns are subject to a 10% restocking fee. All sales final.

**IN FLORIDA CALL 813-493-2736**

**IN NEVADA CALL 702-877-3988**

# COMPUTER MART

1901 S. TAMiami TRAIL, VENICE, FL 33595

2820 W. CHARLESTON, LAS VEGAS, NV 89102



# Compuclassics



## DATA BASE MANAGEMENT

ASHTON TATE  
dBase III 369.00

BORLAND INTERNATIONAL  
Reflex 55.00

FOX & BELLER  
QuickCode III 145.00  
QuickReport III 145.00  
dGraph III 145.00

LEADING EDGE  
Nutshell 79.00

M.D.B.S.  
Knowledge Man (Version 2) 299.00

MICRONIM  
rBase 5000 358.00  
Extended Report Writer 25.00

MICROSTUF  
Infoscope 125.00

NANTUCKET  
Clipper (dBase III Compiler) 369.00

## WORD PROCESSORS

LEADING EDGE  
with Merge & Spell 140.00

LIFETREE  
Volkswriter Deluxe III 159.00

MICROPRO  
Wordstar 178.00  
Wordstar Propack 245.00  
Wordstar 2000 245.00  
Wordstar 2000 Plus 250.00

MICROSOFT  
Word 279.00

MULTIMATE  
Advantage 265.00  
Executive 265.00  
Just Write 89.00  
Multimate 265.00

OBERON  
Oberon Omni-reader 699.00

SAMNA  
Samna Word III 245.00  
Samna + 339.00

SATELLITE SOFTWARE  
Word Perfect 4.1 210.00

## INTEGRATED SOFTWARE

ALPHA SOFTWARE  
Electric Desk 189.00

ASHTON TATE  
Framework II 379.00

LOTUS  
Symphony 445.00  
C.P.A. + 365.00

SOFTWARE GROUP  
Enable 339.00

SOFTWARE PUBLISHING  
PFS Family  
Write Fee 89.00  
File 89.00

## OPEN SYSTEMS

All Modules 335.00  
Business Basic Interpreter 165.00

## REALWORLD

All Modules 369.00

## PROGRAMMING LANGUAGES

## BORLAND INTERNATIONAL

Editor 35.00  
Gameworks 35.00

Graphic Toolbox 30.00

Jumbo Pack 125.00

New Pack 50.00

Turbo Pascal 3.0 35.00

Turbo Toolbox 30.00

Turbo Tutor 15.00

With 5087 50.00

With 5087 & BCD 70.00

## DIGITAL RESEARCH

C Basic Compiler 368.00

## LIFEBOAT ASSOCIATES

Diagram Master 209.00

Signmaster 175.00

## MICROSOFT

In-A-Vision 259.00

PC Draw 249.00

## HARVARD SOFTWARE

Project Manager 255.00

## HARVARD SOFTWARE

Total Project Manager 279.00

## MICROSOFT

Project (New) 259.00

## SCITOR

Project Scheduler Network 329.00

## SORGIM / IUS

Superproject 236.00

## SPREADSHEETS

## LOTUS

Lotus 1-2-3 (Version 2) 339.00

Lotus Report Writer 185.00

## MICROSOFT

Multiple 129.00

## SORGIM / IUS

Supercalc III Release 2 199.00

## COMMUNICATIONS

## HAYES

Smartcom II 90.00

## MICROSTUF

CrossTalk XVI 99.00

Remote 99.00

Transporter 145.00

## WARNER SOFTWARE

Desk Organiser 58.00

## PERSONAL MANAGEMENT

## CONTINENTAL SOFTWARE

Home Accountant Plus 82.00

## LIVING VIDEO TEXT

Ready 48.00

ThinkTalk 99.00

## MECA

Managing Your Money 105.00

## MONOGRAM

Dollars And Sense 99.00

## ADVANTAGES

- We welcome corporate accounts.

- Free technical support.

- Immediate replacement of defective goods.

- Bulk discounts.

## HARDWARE

## MONITORS

AMDEK Our Price  
Amdek 310A 159.00

## PRINTER

C. ITOH All Models CALL

## EPSON

MX 12-E 195.00

NX-12 479.00

SR-12 565.00

Scan Doubler 179.00

## PRINTERS

C. ITOH All Models CALL

## TOSHIBA

1340 529.00

351 1270.00

## OKIDATA

All Models CALL

## MEMORY AND

## MULTIFUNCTION BOARDS

## AST RESEARCH

Sipax Plus w 384K 255.00

Advantage w 120K 390.00

Megabus II w 54K 265.00

## GENOA SYSTEMS

Spectrum 308.00

## HERCULES

Graphics Board 309.00

Color Card 145.00

## PARADISE

Modular Graphics Card 280.00

Fox Pack with 8 K 159.00

## QUADRAM

Quadboard 64K 198.00

## DIOMA DESIGNS

Color 400 400.00

## MODEMS

HAYES 1200 B 365.00

1200 385.00

## MISCELLANEOUS

## KENSINGTON

Masterpiece 68.00

## KEYTRONICS

5151 Keyboard 175.00

## MICROSOFT

Mouse 129.00

Call for prices on IBM computer systems

and for any item not included in this

price list.

1818 705-1895 US  
1800 231-6603 CA  
1800 328-4473 US

Order desk & technical support open:  
8 a.m. to 6 p.m. Monday - Friday  
10 a.m. to 2 p.m. Saturday



6924 CANYON ST SUITE #118 RESEDA CA 91335

CIRCLE 204 ON READER SERVICE CARD

TERMS: All prices subject to change. No  
surcharge for VISA or MasterCard. No  
surcharge American Express. No re-  
turns without RA#. Short shipments  
must be notified with 48 hours. 15%  
restocking fee on non-defective goods;  
\$3.00 C.O.D. charge. Shipping \$4.00 per  
item, less on bulk orders. (\$8.00 Blue  
Label).

# PC PRODUCT INDEX

B&P	PROJECT	ADVERTISER	PAGE#		B&P	PRODUCT	ADVERTISER	PAGE#					
<b>DISK OPERATING SYSTEMS</b>													
203	Benzelis Box	i Omega	148-149		129	Copyrite	Quad Software Ltd.	265					
•	MS-DOS	Microsoft	146-147		129	Prakay	Raw Soft	1					
146	MS-DOS	Microsoft	146-147		129	Utilities	Westland Data Corp.	257					
147	MS-DOS	Microsoft	146-147		129	Fix Recovery System	Brown Bag Software	81					
<b>WINDOWING SOFTWARE</b>													
•	Windows Software	Microsoft	158-159		132	IBM PC COMPATIBLE COMPUTERS	Brown Bag Software	81					
<b>ACCOUNTING SOFTWARE</b>													
472	Accounting Solution	Business Tools, Inc.	305		325	Atlantic Computer Systems XT	Atlantic Computer Systems	248					
146	Accounting Software	DATACOM	146		329	High Performance Computers	Gulfstream Microsystems	300					
380	Ventureware Series	H & E Computer	308		481	IBM Compatible & Accessories	Hi Tech Computers & Electronics	22					
377	Vulley Software	Information Software	293		481	IBM Compatible	Tech PC	186					
473	Accounting for Micro	The James River Group	102		482	Number Speaker	Microway	18					
115	Book Software	Book Associates	281		482	8087 Support	Microway	75					
<b>INTEGRATED ACCOUNTING PACKAGES</b>													
263	Integrated Accounting Package	Macrolink Inc.	5		484	AST & PAR Advanced	AST Research	166-167					
470	dBASE II Accounting	SBT Corp	190-191		485	Memory Board	Compy LaPenne	45					
471	dBASE II Accounting	SBT Corp	190-191		492	Turbo	Orchid Technology	58					
177	Cambridge Spreadsheets Analy	Cambridge Software Collaborative	214		523	Image Capture Board/Video Display	AT&T Electronic Photogaphy	70					
138	Cambridge Spreadsheets Analy	Cambridge Software Collaborative	215		524	Modular Graphics Card	Pixel System	94-95					
115	Book Software	Book Associates	281		347	The Color 400 Card	Sigma Design	180					
<b>TAX AIDS</b>													
121	Tax Software	Clipsoft	73		517	Chameleon	STB Systems	C-3					
<b>COMMUNICATIONS SOFTWARE</b>													
•	Remote	Micro Staff Inc.	197		525	Alpha Satellite Series	Alloy Computer Products	55					
146	Remote	Micro Staff Inc.	197		525	Expansion Units	Compy LaPenne	45					
234	Remote	Micro Staff Inc.	201		524	PC Expander	PC Horizon	304					
<b>OTHER UTILITIES</b>													
777	Utility Software	Information Software	293		526	LapTop	PTG Data Systems	90					
<b>PROJECT MANAGEMENT</b>													
131	Managing Your Money	Micro Macro Educ. Corp. of America	213		527	DataWatch	Mayland Electronics	39					
<b>GRAPHICS SOFTWARE</b>													
482	3D View	Analysis International Inc.	143		528	Via West	Via West	209					
137	3D View	Micrograph	143		<b>MASS STORAGE HARDWARE</b>								
135	Graphics Software	Specimen Holdings	220		529	525 Backup Cartridge	Carver Corp.	123-123					
103	Pop-Ups	Popular Programs	11		529	AT Plus	Core International	80					
<b>PROJECT MANAGERS</b>					530	Power Pack	Drive Adapter Co.	51					
143	Project Planner	Primavera Systems	284		510	DS Backup	Design Software	252					
<b>SOFTWARE FOR PROFESSIONALS</b>					511	Hard Disk Tape Backup	Emerald Systems Corp	230-231					
123	Software For Professionals	Compy La-Penne	45		511	Uninterruptable Power Source	Enterix Electric Co.	119					
522	Productivity Software	Productivity Software	224-225		521	Top Backup	Express Systems	127					
526	QEMM	Digital Research	238-239		522	Type Backup	Express Systems, Inc.	143					
139	Screen Saver Kit	Burton International	179		523	Genes Galaxy Systems	Genes Galaxy Systems	304					
<b>EDUCATIONAL SOFTWARE</b>					491	ATLantic Magnetic Tape	JAM Systems	244					
135	Micro Cup and Micro Logic	Spectrum Software	220		506	Mass Storage	Lincec	206					
120	ROM Math Pak	Hewlett-Packard	39		513	Phoenix Hard Disk	Phoenix Diversified Ind. Inc.	8-9					
•	ROM Setup	Microway	75		501	System Disk Drive & Tape Backup	TECRA	42					
<b>STATISTICAL SOFTWARE</b>													
172	SPSS	SPSS, Inc.	16		501	QC-40	Tecmar	C-2					
<b>ARTIFICIAL INTELLIGENCE SOFTWARE</b>													
143	Turbo Lightning	Burton International	177		<b>COMMUNICATIONS HARDWARE</b>								
219	Software	ClaritySoft Software Inc.	200		564	PC Modem Half Card	Ven-Tel	14					
<b>WORD PROCESSING SOFTWARE</b>					569	LAN	Micro Data Base Systems	203					
149	Word Processing	DAC Software	15		564	Modem	IBM-SSG	48-49					
175	Conver User	MultiMaster International	129		569	Modem	Kyocera International	294					
191	Word Processor	Small Systems Int'l (SSI)	240		570	LAN	Micro Data Base Systems	303					
508	XyWriter 3.0	Xy-Object	91		579	Easy LAN	Server Technology	98					
<b>WORD PROCESSING AIDS</b>					593	MarkLink Advanced	Software Link, Inc.	50					
379	PC Write	Quark Soft	353		<b>DISPLAY MONITORS</b>								
175	Conver User	Mahimai International	129		594	Texas Monitor	Texas	89					
179	Private Label	Polaris	76		595	Precision Monitor	Precision Graphics	204					
<b>MULTIMEDIA SOFTWARE</b>					596	Processor Monitor	Precision Graphics	204					
330	Sofware	Caress Systems	194-195		597	Processor Monitor	Precision Graphics	204					
145	Public Domain Software	PC Software Interest Group	6		601	System Disk Drive & Tape Backup	Toshiba	238-239					
238	Free Public Domain Software	Public Domain Software	240		601	TopBottom	Toshiba	238-239					
<b>INTEGRATED SOFTWARE</b>					602	Alps Dex Matrix Printer	Alps America	298-299					
115	Cambridge Spreadsheets Analy	Cambridge Software	214		603	Fontay	Preditel	47					
118	Cambridge Spreadsheets Analy	Cambridge Software	215		603	Graphic Display	Hewlett-Packard	165					
•	1-2-3 Report Writer	Lotto	175		603	Laser	KannerLab	362					
477	Spreadsheets	Burton International	175		<b>KEYBOARD OVERLAWS</b>								
<b>COMPILES</b>					605	Keystates	Compuer Systems	196					
301	Peek-Pocket	Word Tech Systems	28		605	Mail Order Keystates	Compy La-Penne	45					
150	Turbo Pascal/Holiday Packs	Burton International	173		605	Peek-Pocket	Disk World!	82					
<b>PROGRAMMING TOOLS</b>					605	PC Keystates	MicroSoft	83					
113	Lattice Works	Lattice Inc.	61		605	PC Keystates	Precision Data Products	252					
311	Programmers Tools	PC Board	35-37		<b>ACCESSORIES</b>								
530	Programmers Tools	PC Board	35-37		606	Carte Accessories	Compaq Manufacturing	C-6					
530	Flash Code	Software Bootleg	79		609	Turbo Swatch	Megabolt Corp.	201					
<b>DATA BASE MANAGERS</b>					609	Turner Hall Card	Turner Hall Publishing	216					
101	Knowledgebase II	Micro Data Base Systems	256		<b>KEYBOARD OVERLAWS</b>								
141	Knowledgebase II	Micro Data Base Systems	179		610	PC Document	Systems Management Associates	71					
<b>FILE EDITORS</b>					610	PC Interface	Systems Management Associates	71					
515	File Editor	Bloc Development	211		610	PC Interface	Systems Management Associates	71					
<b>PROGRAM DEVELOPER/GENERATOR TOOLS</b>					611	Computer Utilities	Lykes Computer Systems	196					
346	S Products	Fun & Gitter	88		611	Customer Supplies	Lykes Computer Systems	196					
530	Flash Code	Software Bootleg	79		611	The Power Maker	Topaz	82					
<b>TEXT EDITORS</b>					612	General Reference	Lykes Computer Systems	196					
113	Text Editor	Lattice Inc.	61		612	General Reference	Lykes Computer Systems	196					
<b>SYSTEM UTILITIES</b>					612	General Reference	Lykes Computer Systems	196					
155	Copy II PC	Central Point Software	197		612	General Reference	Lykes Computer Systems	196					
534	Padlock II	Giese Engineering	208		612	General Reference	Lykes Computer Systems	196					
473	Pro-Command	Innovative Technology	100		612	General Reference	Lykes Computer Systems	196					
346	Notus Utilities	Notus Utilities	240		612	General Reference	Lykes Computer Systems	196					

# AT LEAST FIVE MORE REASONS TO DUMP YOUR OLD PRINTER.

# 1986, 19 1989,

If you think your old PC printer is worth keeping, think ahead.

Can you depend on it to run five or more years without fail?

Not likely. Which is why you'll especially like the new Alps P2000™ Dot Matrix Printer.

It's not a bit like your old printer. Or most new printers, for that matter.



In fact, with normal care, it'll take you through 1990 and beyond without a single breakdown.

You see, the P2000 is solidly built with precision parts throughout. Even its print head (often the first thing to go in a printer) has a life span of over 200 million characters.

But you'll appreciate it for a lot more than its reliability.

For one thing, it's incredibly fast.

# **87, 1988, 1990, 199**

It prints drafts at 250 characters per second (cps). Memos at 125 cps. And near letter quality documents at 50 cps.

For another thing, it's truly versatile. It prints everything from letters and graphics to 16-inch-wide spreadsheets. In a variety of type fonts and sizes. What's more, its paper-saving push/pull tractor feed makes printing forms a snap.

And naturally, it's compatible with all the most popular business software and PCs.

For our brochure and the name of our dealer nearest you, please call **(800) 828-ALPS**. In California, (800) 257-7872.

The Alps P2000.

There simply aren't many things you can expect to outlast it.

Except, of course, the company that created it.

**ALPS**  
AMERICA

# Speed things up

*Take the Governor Off  
Your Productivity and Profits  
With IBM™ Compatibles from GMS.*



**GMS PC/88** • 8088 (4.77MHz) Processor • Enhanced System Board with 256 to 640KB • 8 Slots Available • IBM BIOS Guarantee

**GMS PC/88-2** • 8088-2 (4.77 and 7.33MHz) Processor • 54% Faster than IBM/XT • BIOS Compatibility Guarantee with IBM/XT • 10 to 120MB Disk Options • Integrated Tape Back-up • Enhanced System Board with 256 to 640KB • External System Reset Button • 8 Slots Available • TRW Nationwide Service Options

**GMS PC/286** • 80286 (8MHz) Processor • 9 Times Faster than IBM/XT • 30% Faster than IBM/AT • 10 to 120MB Disk Options • Integrated Tape Back-up • BIOS Compatibility Guarantee with IBM/XT • Enhanced System Board with 256 to 640KB • External System Reset Button • 8 Slots Available • TRW Nationwide Service Options

**GMS APC/286** • 80286 (8MHz) Processor • 30% Faster than IBM/AT • BIOS Compatibility Guarantee with IBM/AT • 10 to 120MB Disk Options • Integrated Tape Back-up • 512KB Expands to 1000KB • Enhanced System Board with 12 Expansion Slots • External System Reset Button • TRW Nationwide Service Options



5500 N. Federal Highway, Boca Raton, FL 33431

Telex: 910 380 0112

**1-800-443-0500**

**We're Products. We're Service. We're Support.**

## SHELF CONSCIOUS?

Now you can organize your copies of  
**PC MAGAZINE**

Now your magazines can be a handsome addition to your decor, well organized, and easy to find, thanks to these durable library-quality cases or binders. They're made of luxury-look leatherette over high-quality binder board. And both styles are custom-designed for this or any other magazine you save, with size, color and imprint selected by the publisher. FREE transfer foil included for marking dates and volumes.



### Magazine binders

holds your issues on individual snap-in rods, combining them into one volume. \$7.95 each. 3 for \$22.50, 6 for \$42.50. Mixed titles OK for quantity prices



### Open-back cases

store your issues for individual reference. \$6.95 each; 3 for \$19.75; 6 for \$37.50. Mixed titles OK for quantity prices



**OR CALL**  
**1-212-503-5319**

### PC Magazine

P.O. Box 5120, Philadelphia, PA 19141

Please send  Cases  Binders

QUANTITY \_\_\_\_\_

TITLE \_\_\_\_\_

PC Magazine

Other \_\_\_\_\_

PAYMENT ENCLOSED \$\_\_\_\_\_ \* Add \$1.00 per order for postage and handling. Outside USA add \$2.50 per order, send US funds only

CHARGE (Minimum \$10)  
 American Express  MasterCard  
 Visa

Card No. \_\_\_\_\_ Exp Date \_\_\_\_\_

Signature \_\_\_\_\_

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_

\*Residents of PA add 6% sales tax

# THE C AROUND US

Some 75 percent of the new commercial programs for the IBM PC are written in C. These two books show how to apply C to business situations and build macros for common tasks.

C is quickly becoming my favorite programming language, and I'm not the only one who is enthusiastic about it. About 75 percent of the new commercial programs for the IBM PC are being written in C. The language is clean, concise, flexible, portable, and efficient; it combines the structure of Pascal with the power and freedom of assembly language. C was developed in the early 1970s at Bell Labs for use on the UNIX operating system, but it's almost equally at home running under DOS. Here are two new books that may help programmers make the most of this powerful language.

**BECOMING A C PROFESSIONAL**  
*Variations in C*, by Steve Schustack, is an attractively produced book with a variety of typefaces and designs that has come to be characteristic of Microsoft Press books. I particularly like the little "Comment" and "Caution" boxes that adorn the text like screen pop-ups.

Yet it's not just the classy page layouts that make this a good book. Most of all it's Schustack's lively and lucid style and his infectious enthusiasm about C. I found it difficult to stay put while reading this book because it kept giving me ideas for C code that I immediately wanted to try out.

*Variations in C* is aimed at the experienced programmer, preferably one skilled in another structured language. The examples and discussion are based on (but not limited to) the Microsoft C Compiler, Version 3.0. (With Microsoft's clout, it has a good chance of becoming something of a PC standard.)

Because of its intended audience, *Variations in C* quickly goes through familiar material (like flow of control) and spends a greater amount of time on topics more peculiar to C. There's a nice healthy chapter on the preprocessor and another one on variable scope.

The central section of the book shows the complete construction of a large order-entry program with full-screen fill-in menus. Illustrating a large application is not always the best way to approach language instruction, but programmers involved in business applications of C may find much of value in this code. A com-

panion disk that includes the program source code is available for \$12.95.

*Variations in C* starts off with a bang, but toward the end it doesn't really live up to its promise of showing advanced techniques of C programming. It almost seems as if Schustack was exhausted after writing the large order-entry program and didn't have much strength to continue.

Real-life programming for the IBM PC has been characterized by extensive direct hardware control, but Schustack doesn't get close to the hardware at all. He uses ANSI control sequences for the order-entry program, talks about BIOS control of the display without really showing how it's done, and then promises to show later how the screen can be directly accessed with "far" pointers. Unfortunately, he never gets around to this last topic, which has value beyond display control.

One warning—if you get the Microsoft C Compiler, do not treat this book as a substitute for the compiler manual. The Microsoft manual is very well done and often addresses topics that no one else bothers with, such as writing functions with a variable number of arguments and packing structures so integers don't start on even address boundaries. But Schustack's book is a good companion to the Microsoft manual, particularly for programmers who must apply C to business applications. A second volume that covers the really advanced stuff would be most welcome.

**CODE, CODE, CODE** Often the best way to learn the techniques and tricks of a new programming language is to study lit-



## FACT FILE

**Variations in C**  
Steve Schustack  
Microsoft Press  
10700 Northgate Way  
Bellevue, WA 98009  
(415) 548-2805  
Copyright: 1985  
Cover Price: \$19.95  
ISBN: 0-914845-48-9  
**CIRCLE 688 ON READER SERVICE CARD**

**The C Library**  
Kris Jamsa  
Osborne McGraw-Hill  
2600 Tenth St.  
Berkeley, CA 94710  
(415) 548-2805  
Copyright: 1985  
Cover Price: \$18.95  
ISBN: 0-07-881110-4  
**CIRCLE 687 ON READER SERVICE CARD**

## ■ BOOK REVIEW

tie nuggets of existing code. Kris Jamsa's *The C Library* has so much C code that you can go on for pages and pages without encountering much normal text. It's almost like Jamsa did a PRINT \*.\* on his C subdirectory.

Like *Variations in C*, this is not a beginners book, and it is not the author's intention to teach the rudiments of C in this book. His 35 pages of syntax charts in the first chapter serve as enough reference material. Instead he covers C as it applies to common, low-level tasks (such as string manipulation and sorting) by illustrating over 125 functions introduced by good discussions and simple but helpful diagrams. Jamsa makes available a \$29.95 MS-DOS disk that has all the procedures in the book, and more.

The functions are shown in a uniform format with extensive and detailed comments, including a pseudo-code summary of the workings of the code. At times, for

instance, in his procedure to copy one string to another, the pseudo code is longer than the C code. The organization is methodical and well thought out.

*The C Library* gets started with simple macros. Jamsa builds on the macros to create some simple functions, then builds on the simple functions to create more-complex ones, and finally puts them all together for some useful UNIX-like utility programs. These include a DIFF program that compares two text files and displays the lines that are different, a file encryption program, and a program to insert blanks in front of each line of a file so that you can print out the file with a wide margin for notebook punch holes.

One advantage of Jamsa's approach is that it lets him spend an entire chapter on recursion, for example, and actually illustrate the technique—which involves a function calling itself—with eight recursive functions. There's a chapter on sort-

ing and another on writing "filter" programs in C.

*The C Library* can be used by several types of people. First, if the C compiler you're using has a weak library, this is an ideal source for beefing it up. Second, even if you have no need for some of the basic functions of your C compiler (for instance, if your C library already contains functions that copy, concatenate, search, and compare strings), the techniques for doing simple low-level tasks are valuable regardless.

Finally, think of Jamsa's routines as pieces of a puzzle that can be put together in thousands of different ways. He's shown you a few solutions, and now the rest is up to you. *The C Library* is ultimately a book to expand on and have fun with. ■

*Charles Petzold* is a contributing editor of PC Magazine.

## Build Your Own IBM Compatible System

### XT Building Tools

#### MONITOR ADAPTOR

Mono w/a printer port	\$99
Color Graphics	\$99
Mono w/printer port	\$135
Color Graphics w/p. port	\$135
Mono Graphics w/p. port	\$175
SIB Chaurfer	\$299
Everex EDGE	\$299
Persyst Ball	\$395
Color 400	\$400

#### MULTIFUNCTION BOARDS

AST Six Pak 384K	\$299
Quad 384K	\$299
384K Generic 6-pack	\$195

#### MISC. ITEMS

Floppy controller	\$69
DTC Hard disk controller	\$245
Ieac 556	\$99
Quine 142	\$75
135 W Power Supply	\$99
XT Mother Board	\$250
Turbo Mother Board	\$350
Chassis	\$99
5150 style Keyboard	\$99
5151 style Keyboard	\$155
All style for XT	\$135

### IBM XT Compatible KIT

**\$695**

Dual DS/DD, 256K, 8 Slots, 135W Keyboard



**PC SOLUTION**

ASSEMBLED SYSTEMS

All Systems Include: 8 Slots, 135W Keyboard,  
90 Day Warranty. Hard disk systems as below.

#### PC Solution XT

2 D5/DD, 256K	\$795
2 D5/DD, 10 Meg	\$1295

#### PC Solution TURBO

2 D5/DD, 256K	\$895
2 D5/DD, 10 Meg, 640K	\$1495

#### AT Solution

Base, 256K	\$2295
Enhanced, 512K, 20 Meg	\$2995

#### Hard Disks & Controllers

10 Meg Internal	\$535
20 Meg Internal	\$835
30 Meg Internal	\$995
10 Meg External	\$699
20 Meg External	\$899

#### MODEMS

Hayes 1200	\$399
Hayes 1200B	\$315
Everex 1200B	\$195

#### MONITORS

Tatung	\$160
Taxan 121	\$165
PDS MAX-12E	\$185
PDS HX-12	\$450
Taxan 425	\$425
Taxan 440	\$550
Xtron TTL	\$125

#### PRINTERS

Panasonic 1091	\$259
Panasonic 1092	\$369
Conan PW1080	\$299
Citizen MSP-10	\$289
Epson FX85	Call
Epson FX185	Call
Toshiba 1340	\$549
Toshiba 351	1295

**Hi-Tec Computers & Electronics • (301) 564-9500**

IBM is a trade mark of IBM

10524 DeRicke Ave., Kensington, MD 20895

PC Solution is a trade mark of Hi-TEC Enterprises Inc.

# INDEX TO ADVERTISERS

RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page
202	Alloy Computer Products	55	*	Emerald Systems	230-231	151	MEECA	213	309	Progressive Micro Distributors	26-21
230	Alps America	296-299	161	Emerson Electric	119	389	Megahertz	201	300	Prosoft	47
179	American Digital Discount	242	383	Express Systems	125	301	Micro Data Base Systems	256	528	Public Domain Software	248
507	American Micro Technology	248	381	Express Systems	136	109	Micro Data Base Systems	203	*	Quaid	265
482	Analytics International	163	382	Express Systems	127	157	Micrograffix	32	235	Qubiq	2-3
114	Arlington Computer Products	78	247	47 Computer	96-97	233	Micro Mail	52-53	379	Quicksoft	153
104	AST Research, Inc.	166-167	248	Fox & Geller	88	133	Micro Mart	92-93	115	Rose Associates	261
523	AT & T Electronic Photography	70	250	FTG Data Systems	254	*	Microsoft	146-147	129	Rose Soft	1
325	Atlantic Computer Systems	248	266	General Technology	234	*	Microsoft	148	512	Rushkover of America	196
527	Bay Express	212	239	Genex Systems	143	*	Microsoft	158-159	*	Satellite Software International	89
515	BICL Development	211	214	Glenco Engineering	206	*	Microsoft	160	470	SBT Corporation	190-191
150	Bordland International	173	330	Gulfstream Microsystems	300	*	Microsoft	197	519	Server Technology	96
147	Bordland International	175	366	H&E Comptronics	306	*	Microsoft	199	347	Signia Design	180
142	Bordland International	177	303	Hammermill	262	*	Microsoft	201	302	Simon & Schuster	364
139	Bordland International	179	120	Hannsgage Computer Works	10	214	MicroWay, Inc.	18	*	Sofline	77
122	Brown Bag Software	81	146	Hercules Computer Technology	237	159	MicroWay	75	530	Software Bottling Company	79
*	Business Computers, Inc.	189	141	Hercules Computer Technology	229	*	Minority Hi Tech Industries	188	393	Software Link, Inc.	56
472	Business Tools, Inc.	305	154	Iomega	166-169	208	MLI Microsystems	152	135	Spectrum Holoboy	220
117	Cambridge Software	214	481	Hewlett-Packard	165	215	Multimate Electronics	129	496	Spectrum Software	74
118	Cambridge Software	215	481	Hewlett-Packard	165	216	Northeastern Software	28-29	172	SPSS Inc.	16
525	Carter Corporation	122-123	143	Ibex Computer Corporation	304	126	Norton Utilities	240	517	STB Systems	C-3
330	Couzin Systems	194-195	164	IBM-35G Division	48-49	127	NRRI Schools	235	42	* Sygen Industries	42
155	Central Point Software	197	197	Information Software	293	128	Ochid Technology	58	165	Systems Management Associates	71
219	Chakovsky Software	200	227	Innosse	209	129	Oryx Systems	246-247	489	Taxan	89
121	Chipssoft	73	473	Innovative Technology	100	130	Paradise Systems	94-95	328	Tech PC	186
184	Command Technology Corp.	251	104	Imagem	168-169	131	PC Brand	25	501	Tecmar Inc.	C2
228	CompuAdd Corp.	306-307	*	Jones River Group	102	132	PC Brand	26-27	170	Telafon	see Telemart
204	Compuclassics	296	154	J & M Systems	248	133	PC Connection	134-139	170	Telemart	44
226	Computer Information Service	255	189	Kyocera International	294	134	PC Horizons Inc.	304	249	Texas Computer Systems	154
*	Computer Book Club	245	250	LeSalle Mac	170	135	PC Network	63	353	Topaz	258
182	Computer Mail Order	192-193	113	Lattice	61	136	PC Network	64-67	119	Toshiba	259
183	Computer Mart	295	506	Lintec	206	137	PC's Limited	41	107	Toshiba	216
127	Computer Products Unlimited	60	400	Logistics	83-86	138	PC's Limited	36-37	205	Turner Hall Publishing	216
128	Conroy-La Pointe, Inc.	45	*	Lotus	22	139	PC Software Interest Group	4	364	Ven-Tel Inc.	14
225	Core International	40	267	Lyphen	199	141	Phorma Diversified Ind. Inc.	8-9	475	Vix West	209
218	Cosmos	68	263	Macola Inc.	5	142	Phoenix Program	11	152	Warehouse Data Products	264
*	Curtis Manufacturing	C4	237	Main Street Computer	30-31	143	Precision Data Products	252	201	Westel Data Corp.	267
148	Das Software, Inc.	17	364	Manfield Software Group	246	144	Primesoft Systems, Inc.	288	201	World Tech Systems	24
149	Dac Software, Inc.	19	478	Maysand Electronics	39	145	Princeton Graphics Systems	236	318	World Wide Access	72
199	David Alridge Co.	57	229	Maxell	12	146	Productivity Software	224-225	XY Quest Inc.	91	
510	Design Software	252	167	MCBS	196	147	Pyramid	204			
526	Digital Research	238-239	168	MCBS	276	148	Quattro Pro	204			
144	Disk World, Inc.	62	2	McGraw-Hill Programming and Software Design	103-105	149	Radius	204			
311	Etech Research, Inc.	253				150	Realistic	204			

## PC MAGAZINE ADVERTISING SALES STAFF

Advertising Coordinators . . . Robert Simpson, Jeanne Woodlock  
1 Park Avenue, New York, NY 10016 (212) 503-5100

**MA, NH, VT, ME, RI, CT**  
 Kathy Krocks - District Manager  
 160 State Street  
 Boston, MA 02109  
 (617)367-7190  
 John Bucknavage - Account Representative  
 (212)503-5100  
 Se, NJ, DE, MD, DC, VA, WV, NC,  
 SC, AL, MS, TN, AR, KY, PA, GA  
 Jerry Bruck - District Manager  
 1 Park Avenue  
 New York, NY 10016  
 (212)503-5308  
 Lauren Morse - Account Representative  
 (212)503-5100  
 NY, NJ, FL

1 Park Avenue  
 New York, NY 10016  
 (212)503-5307  
 John Bucknavage - Account Representative  
 (212)503-5100  
 NE, WI, IL, IN, MN, MO,  
 OH, MI, IA, ND, SD, Canada  
 John Hemmest - District Manager  
 1801 University Avenue Suite 1400  
 Chicago, IL 60601  
 (312)346-2000  
 Michael Turpanian - Account  
 Representative  
 (212)503-5100  
 Jeff Miller - Western Advertising Manager  
 4 California Financial & North, OR, WA  
 Dave Riegler - District Manager

11 Davis Drive  
 Belmont, CA 94002  
 (415)598-2341  
 Lauren Morse - Account Representative  
 (212)503-5100  
 CA (Santa Barbara to So. San  
 Francisco), CO, ID, MT, AK, NV  
 Janice Ryan - District Manager  
 11 Davis Drive  
 Belmont, CA 94002  
 (415)598-2341  
 Michael Turpanian - Account  
 Representative  
 (212)503-5100  
 CA (Orange County), AZ  
 Jeff Miller - District Manager  
 1601 Dove Street

(714)476-0749  
 Stan Johnson - Account Representative  
 (212)503-5100  
 CA (Los Angeles & San Diego), HI  
 Steve Lincoln - District Manager  
 3460 Wilshire Blvd.  
 Los Angeles, CA 90010  
 (313)387-2100  
 Jennifer Bartel - Account Representative  
 (212)503-5100  
 TX, OK, LA, KS, UT, NM  
 Jennifer Bartel - District Manager  
 3956 Sherry Lane  
 Dallas, TX 75225 (214) 691-6934  
 Joanne Broome - Account Representative  
 (212)503-5100

**DOUBLE  
THE OPTION CAPACITY  
OF YOUR IBM  
PERSONAL COMPUTER**

# PC-XTRA

- DIRECT EXTENSION OF PC BUS
- NO SOFTWARE CHANGES
- NO HARDWARE MODIFICATION
- STYLING CONSISTENT WITH IBM

Add all those special options you've been wanting without worrying about filling plug-in and back panel space.



DEALER INQUIRIES INVITED.

**\$549.00\*** F.O.B. SANTA ANA  
(CALIFORNIA RESIDENTS ADD 6% SALES TAX)

**PC HORIZONS, INC.**  
1701 E. Edinger  
Suite A6,  
Santa Ana, CA 92705  
(714) 953-5396

CIRCLE 194 ON READER SERVICE CARD

**9-TRACK MAG. TAPE  
SUBSYSTEM FOR THE  
IBM PC/XT/AT**



**\$4757**

For information interchange, backup and archival storage, IBEX offers a 9-track, IBM format-compatible  $\frac{1}{2}$ " magnetic tape subsystem for the IBM PC, featuring:

- 42 M-Bytes on a single reel.
- IBM format 1600 cpi.
- Software for PC-DOS, MS-DOS.

Write, phone or TWX for information

**I B E X**

**IBEX COMPUTER CORP.**  
20741 Marlin St., Chatsworth, CA 91311  
(818) 709-8100 TWX: 910-480-2071

CIRCLE 143 ON READER SERVICE CARD

The classic, definitive work on the IBM PC—now fully revised and enlarged by the world's leading expert on IBM microcomputers

**PETER NORTON**

# Inside the IBM PC

ACCESS TO  
ADVANCED  
FEATURES  
AND  
PROGRAMMING

**NEW!**

From the renowned  
IBM PC authority

**PETER NORTON**



Now covers every model of the IBM micro (PC, PCjr, XT, and the new AT).

- Updated and revised—plus 100 pages of new information!
- The most complete guide to the IBM PC available anywhere!

A **Brady** BOOK

\$19.95 at your book or computer store. Or order toll-free today.

**800-624-0023**

In New Jersey 800-624-0024

CIRCLE 302 ON READER SERVICE CARD

**PC**  
MAGAZINE

# COMING UP

## ALTERNATIVE OPERATING ENVIRONMENTS

Finally, viable ways to get around the familiar but frustrating DOS command prompt are available. Alternative operating environments are more than just pretty faces; they surround DOS with a shell, turning your display into a menu-oriented desktop for selecting and running PC applications. Some of these systems allow switching, windowing, cut-and-paste operations, and multitasking, and some include their own versions of pop-up desktop utilities. *PC Magazine* compares the power and value of four top contenders: IBM's *TopView*, Microsoft Windows, Digital Research's *GEM Desktop*, and Quarterdeck's *DESQview*.

## HIGH-PERFORMANCE COMPATIBLES

As long as computer manufacturers continue to produce high-performance machines that rival the IBM PC AT, *PC Magazine* will keep on benchmarking them. Jon Pepper, Frank Derfler, Winn Rosch, and Jared Taylor torture-test the AT&T 6300 PLUS, Texas Instruments Business Pro, Zenith Z-158, Basic Time BT/AT, Victor VPC, HP Vectra, Sperry PC/IT, and PC's Limited AT.

## TAX PREPARATION PROGRAMS

April 15th isn't too far away, but you don't have to dread the big day. *PC Magazine* looks at four tax preparation programs that will make tax time easier for you. The packages are representative of what's available, ranging from a user-supported program to a \$1,650, 21-disk package aimed at professional preparers.

## SPECIAL REPORT: MORE WORD PROCESSING

Try as we might, we couldn't cram all the word processing categories and programs into one blockbuster issue (Volume 5 Number 2). The low-down on word processing power continues with reviews of scientific word processors, word processing portions of integrated packages, and word processors that run under alternative operating environments.

# TAS™

**the "Hard-nosed" Relational Database**

# \$199.

**the Database + Integrated Accounting**

# \$349.

### If You Liked DBase III, You'll Flip Over TAS™

Hard-nosed business owners have been asking for the power of DBase III™ and RBase 5000™ but without the high price. That's why Business Tools, Inc. created TAS™.

Compare TAS with DBase III and RBase 5000. You'll see why we think TAS is the best "Hard-nosed" value around. TAS includes a data dictionary. TAS includes a true procedural language. TAS includes a run-time compiler. Plus TAS can be upgraded to multi-user for \$100.

TAS lets you develop your own professional menu-driven business applications. And not just simple ones either. TAS applications can hold up to 17 million records. And because TAS compiles them, they run fast.

### Get TAS Accounting Software for \$349

But why stop with just a database? For just \$349, you get TAS Relational Database/Language plus General Ledger, Accounts Receivable and Accounts Payable. And for \$499 you get all the above plus Inventory, Sales Order Entry, Purchase Order Entry, and Payroll.

Source code is included FREE! So you can even modify the accounting to fit your business.

CIRCLE 472 ON READER SERVICE CARD



4038-B 128th Ave. SE  
Suite 266  
Bellevue, WA 98006

The following are registered trademarks of their companies: TAS Accounting Solution, Business Tools Inc., RBase 5000, Microsoft, DBase III, Ashton-Tate Inc., CP/M, PC DOS, MS-DOS, PC, PC/AT, PCjr, PC/XT, PC/XT/AT, PC/XT/AT+, Compaq, AT&T 6300, Tandy 1000, 1200, 2000, and most MS-DOS, CP/M™ and MP/M™ systems. Multi-user and LAN versions also available.

	TAS™	DBASE III	RBASE 5000
Multi-User	\$100	No	\$100
Data Dictionary	Yes	No	Yes
Procedural Language	Yes	Yes	Yes
Compiler	Yes	No	Yes
Records Per File	Unlimited	Unlimited	Unlimited
Files Open	16	10	40
Fields Per File	Unlimited	128	400
File Size	Unlimited	Unlimited	Unlimited
Record Size	10,254	4,000	1,530
Field Size	254	254	1,530
Prices	\$199	\$696	\$700

And TAS is no new comer. TAS was written by Phil Mickelson, the same "Hard-nosed" business person who created The Sensible Solution™ [relational database] in 1982.

TAS comes with a 30 day money back guarantee [less handling fee of \$15 Level I, \$30 Level 2, \$45 Level 3 and \$10 Multi-User]. TAS is available for the IBM PC/XT/AT, Compaq, AT&T 6300, Tandy 1000, 1200, 2000, and most MS-DOS, CP/M™ and MP/M™ systems. Multi-user and LAN versions also available.

**Call Today 1-800-648-6258  
Ask for operator 22**

Call our Toll-Free Hotline. Use your VISA or MasterCard to order today. Outside Washington call 1-800-648-6258. Washington residents call 1-206-644-2015.

**Dealer Inquiries Welcome.**

# TAS™

**NOT COPY-PROTECTED**

"Affordable Software For Your Business Needs"

Describe your computer system:

8 bit  
 CPM, MP/M  
 TurboDOS

MS-DOS  
 PC-DOS

5 1/4"  3 1/2"

Quantity:  
Level 1 Database/Language - \$199  
Level 2 Accounting (TAS, GL, AP) - \$349  
Level 3 Accounting (Level 2, SO, PO, INV, PUR) - \$460  
Multi-user upgrade - \$100  
Subtotal (WA add 7.2% tax)  
Shipping (\$15 - \$50 ea.)  
(Foreign - \$20 ea.)

Computer name/model is: \_\_\_\_\_

Total Enclosed: \_\_\_\_\_

Name: \_\_\_\_\_

Payment:  VISA  MC  Cashier's Check

Street: \_\_\_\_\_

(All amounts are payable in U.S. funds only)

City: \_\_\_\_\_

Credit Card Expiration Date: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_

Card Number: \_\_\_\_\_

Phone: \_\_\_\_\_

Name on card: \_\_\_\_\_

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

Suite 266

Bellevue, WA 98006

4038-B 128th Ave. SE

Signature: \_\_\_\_\_

&lt;

CALL  
TOLL FREE  
800-531-5475

**CompuAdd**

"Personal Computer Products"

FREE UPS  
SHIPPING!



Monitor Not Included

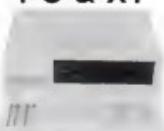
**STANDARD<sup>®</sup>**  
BRAND PRODUCTS  
**PC/XT**

*Runs All Major  
Software Written For  
IBM PC & PC-XT*

- Intel 8088-3(4.77 MHz)
- Standard Keyboard
- 1-Half-Height Floppy Disk Drive
- 640K Ram
- 135 Watt Power Supply
- 8 Total Slots

**\$649**

**IBM<sup>®</sup>  
PC & XT**



PC w/256K, 2 Drives... \$1589  
XT w/256K, 1 Drive... \$1729

**COMPAQ<sup>®</sup> Portable**



✓ 256K Ram  
✓ 2-360KB Floppy Drives

**\$1849**

**IBM<sup>®</sup>  
AT**



✓ 256K Ram  
• One 1.2 MB Floppy Drive

**\$3200**



**Hard Disk  
Kits for the  
IBM<sup>®</sup> PC**

Convert your PC to an XT with  
our hard disk kits. Complete with  
hard disk controller, cables, manuals, mounting  
hardware and easy to use software.

One Year Warranty!

20 MB Hard Disk Kit... \$465  
30 MB Hard Disk Kit... \$679

**Hard Disk Kits  
for the IBM<sup>®</sup> AT**

- 38 msec Average Access Time
- Fully PC-AT Compatible
- Boots Directly From Hard Disk
- Includes Cables, Manual & Mounting Rails

High Performance,  
Fast Access  
Winchester Hard Disks

**\$549** **\$649**  
20 MB 30 MB

**Hard Disk Kits  
for the  
COMPAQ<sup>®</sup>  
Portable**

• 3½" Shock Mounted  
Winchester Hard Disk  
• Hard Disk Controller  
• Cables  
• Manual  
• Software

**\$469** **\$579**  
10 MB 20 MB

# AST SixPakPlus

w/384K



The World's Best-Selling Multifunction Board  
For The IBM PC

# \$249

New 2 Year  
Warranty!

## AST Advantage!

w/128K



# \$399

w/1.5 MB... \$569

# STANDARD BRAND PRODUCTS

MFC  
w/384K



- 384K Ram
- Game Port
- Print Buffer software
- Serial Port
- Parallel Port
- Clock/Calendar

# \$129

## Memory

9 Chips Per Set  
1 Year Warranty<sup>1</sup>

64K.....	<b>\$8</b>
256K...	<b>\$29</b>

## STANDARD AT-MFC

w/128K



# \$299

w/1.5 MB.... \$469

## Standard 5151 Keyboard



# \$99

## Standard FDC Floppy Disk Controller



# \$49

## Standard I/O Parallel & Serial Port



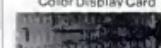
# \$99

## Standard MonoCard Monochrome Display Card



# \$119

## Standard ColorCard Color Display Card



# \$99



Smartmodems

300
1200B
1200
2400

\$159
\$349
\$389
\$699



Math Co-Processor

8087.....	<b>\$119</b>
80287.....	<b>\$219</b>



## Hercules "Strong On Graphics"

Monochrome Graphics Card.....

# \$309

\$165

Color Graphics Card.....



360K  
Floppy Drive  
for the IBM AT

# \$109

## PGS Princeton Graphic Systems

HX-12 Color Monitor.....

# \$459



310A Monochrome Monitor.....

# \$159



## Hard Disk Chassis

Full Height
Half-Height

<b>\$149</b>
<b>\$149</b>



## Teac or Panasonic

<b>\$95</b>
-------------

## Diskettes

Verbatim S/S.....	<b>\$19</b>
Verbatim D/S.....	<b>\$28</b>

Maxell High density For IBM AT.....	<b>\$45</b>
--	-------------

## 135 Watt Power Supply



<b>\$85</b>
-------------

## Printer Cable



<b>\$19</b>
-------------

CIRCLE 228 ON READER SERVICE CARD

**Our Policy:** All prices include fully insured, UPS ground shipping, on all orders shipped in continental U.S.A. No surcharge for purchases over \$100. MasterCard or UPS COD payments (Minimum purchase of \$50 on COD & non return orders). We accept Fortune 1000 & institutional purchases on a net terms basis (with credit approval) at no additional charge. Allow 7 days for personal check and company checks to clear.

Add 6-16% sales tax if a Texas resident. Prices are subject to change. All equipment carries a new factory warranty. All returned items must be accompanied by a return authorization number and subject to restocking fee.

**Corporate & Institutional Accounts Welcome:** Our national accounts division is dedicated to providing the prompt professional service required to keep your business running smoothly. We accept P.O.'s on a net terms basis, minimum order \$50 please offer next day shipping, free fully insured UPS ground shipping. We offer a full-time technical staff to answer any questions that might arise early to make fast repair if needed. You'll notice the difference.

For product information, price quotes, technical support and orders call: (800) 531-5475 (outside Texas) / (512) 250-1469 (within Texas)



12303-G Technology  
Austin, Tx. 78727

# Introducing the Most Powerful Business Software Ever!

FOR YOUR IBM • APPLE • MAC • TRS-80 • KAYPRO • COMMODORE • MSDOS OR CP/M COMPUTER\*

OVER  
100,000  
SOLD



## The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

### VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete memo-driven accounts receivable, invoicing, and billing system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

### VERSPAYABLES™

\$99.95

VERSPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

### VERSPAYROLL™

\$99.95

VERSPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are made. Payroll can be run with total operator control, or with access for operator approval. A program can be run totally automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

### VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory details, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

### VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software.

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system).
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

### SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and is backed by a one year warranty. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M based Computers must be equipped with Microsoft BASIC (IMBASIC or BASIC 80).

#### To Order:

Write or call Toll-free (800) 431-2818  
(N.Y. residents call 914-425-1535)

\* add \$3 for shipping in UPS areas

\* add \$4 for C.O.D. or non UPS areas

\* add \$5 to CANADA or MEXICO

\* add proper postage elsewhere

#### DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability

# COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

CIRCLE 260 ON READER SERVICE CARD

# STB puts an EGA *PLUS*<sup>TM</sup> in your hand *...NOW!*

(We didn't join 'em  
... we beat 'em!)

#### The Best Features:

Everyone's been talking about their Enhanced Graphic Adapters... but you don't want talk... you want product! STB's got it and STB is delivering EGA *PLUS*<sup>TM</sup> NOW!!!

STB's EGA *PLUS*<sup>TM</sup> is a universal video board that operates in 16 different text and graphics modes, and is compatible with the IBM Enhanced Graphics Adapter<sup>TM</sup>. STB's EGA *PLUS*<sup>TM</sup> also provides 256K memory without need for the IBM Graphics Memory Expansion Card<sup>TM</sup>... saving you money!

#### YOU COMPARE THE FEATURES:

STANDARD FEATURES	EGA <i>PLUS</i> <sup>TM</sup>	IBM <sup>TM</sup>
Supports IBM PC XT AT <sup>TM</sup> and compatibles	✓	✓
Supports 640 x 350 for IBM's Enhanced Color and Monochrome Displays and compatible monitors	✓	✓
Supports full 16 colors in 640 x 350 on the IBM Enhanced Color Display <sup>TM</sup> and compatibles	✓	✓
Supports full 16 colors in 640 x 200 and 320 x 200 for the IBM Color Display	✓	✓
Parallel printer port	✓	
Soft scrolling, panning and windowing	✓	✓
Optional Clock/Calendar	✓	
Supports a light pen interface	✓	✓
Includes PC Accelerator <sup>TM</sup> , STB's exclusive utility program which provides up to 10 disk emulators, 3 print spoolers and utilizes available system memory. PC AT memory above one megabyte and EMS memory [Lotus <sup>TM</sup> , Intel <sup>TM</sup> , Microsoft <sup>TM</sup> ] through STB's Memory Companion PC <sup>TM</sup> board	✓	
Which board sells for 40% less than the other comparable product?	✓	

#### The Best Company

STB... born to be "Simply The Best". STB Systems, Inc. has dedicated itself since 1981 to designing and manufacturing the best in expansion products for personal computers.

Proven by performance, STB has earned the reputation in the marketplace of consistently providing the most asked for features in each of its expansion products, at a competitive price. "Simply the Best" in value on the market today.

STB carries this concept through from highly sophisticated board design... to no-compromise quality control in every phase of manufacturing... followed by full functional product testing, continuing through all aspects of documentation and support.

STB leaves nothing to chance to insure that we will remain at the leading edge of the marketplace producing innovative products of the highest quality, staying "Simply The Best". It's not easy, but it's worth it... to you and to us!

CIRCLE 517 ON READER SERVICE CARD

EGA *PLUS*, Memory Companion-PC trademarks of STB Systems, Inc. IBM IBM PC XT AT<sup>TM</sup>, IBM Enhanced Graphics Adapter, IBM Enhanced Color Display, IBM Graphics Memory Expansion Card registered trademarks of International Business Machines Corp. PC Accelerator trademark of RESICORP. Lotus trademark of Lotus Development Corp. Intel trademark of Intel Corp. Microsoft trademark of Microsoft Corporation

*Simply The Best*

**STB**  
STB Systems, Inc.

601 N. Glenville, Suite 125 • Richardson, Texas 75081 • (214) 234-8750

*The Experts in Accessories*



Compaq Deskpro

IBM-PC, XT



adjusts from  
4 to 7½ inches

## Simply Adjustable Universal System Stand

The new SS-3 System Stand from Curtis adjusts from 4 to 7½ inches to accommodate almost any system unit including the IBM-PC, XT, AT, Compaq Deskpro, hard disk drives, and the Bernoulli Box. Constructed of high-impact ABS, it is colored and textured to match or complement all microcomputer systems. Clean up your workspace — put your system unit on the floor. Get organized and more productive with the SS-3 System Stand from Curtis — the experts in accessories. Retail... \$29.95

Curtis products are available nationally from leading Dealers, Distributors, and Retail Chains.  
In Canada: Micro-Computer Products, P.O. Box 235, Ajax, ONT, Canada L1S 3C3, (416) 427-6612

For the Curtis dealer nearest you call (603) 924-3823

Adjust from  
4 to 7½ inches.

High-Impact ABS.  
Matches or complements  
all microcomputer systems  
in color and texture.

Lifetime  
Warranty.

Rugged design.  
Proven stability for desktop  
or floor use.



Manufacturing Company, Inc.

# CURTIS

305 Union Street, Peterborough, NH 03458

PC  
MAG  
L  
-  
B  
R  
A  
R  
Y